OM-1588E September 1997
Eff. w/Serial Number KH419805

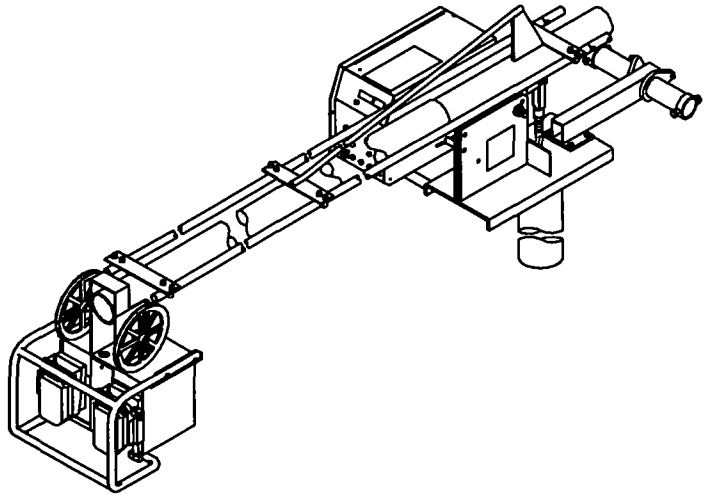
Processes

MIG (GMAW) Welding
Pulsed MIG (GMAW-P)
Flux Cored (FCAW) Welding

Description

Wire Feeder
(Use with CC/CV Power Sources)

DS-64M Swingarc™



12 and 16 Foot

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OWNER'S MANUAL

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

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Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

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For practical information on welding, process applications, and Miller products, visit our website at

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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable – do not use work clamp or work cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

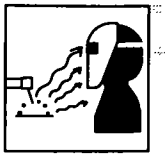
SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



ARC RAYS can burn eyes and skin.

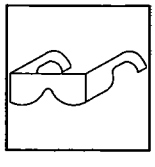
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



FLYING METAL can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.

MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

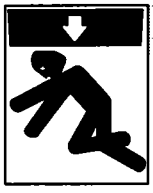
Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

1-3. Additional Symbols For Installation, Operation, And Maintenance

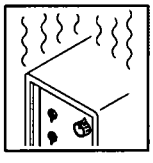
FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.

STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

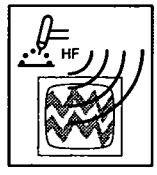
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

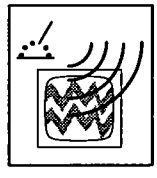
MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 1 – CONSIGNES DE SECURITE – LIRE AVANT UTILISATION

1-1. Signification des symboles

Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie NOTA ; n'est pas relatif à la sécurité.*

1-2. Dangers relatifs au soudage à l'arc

▲ **Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-4 Veuillez lire et respecter toutes ces normes de sécurité.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**

UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

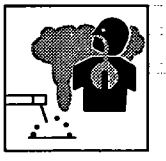
- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique àcourant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique àcourant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique àcourant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct – ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.

Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.



LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

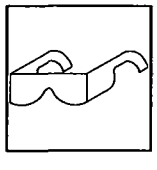
Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage muni d'un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.
- Utiliser des écrans ou des barrières pour protéger des tiers de l'éclair et de l'éblouissement; demander aux autres personnes de ne pas regarder l'arc.
- Porter des vêtements de protection constitué dans une matière durable, résistant au feu (cuir ou laine) et une protection des pieds.

LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.



DES PARTICULES VOLANTES peuvent blesser les yeux.

- Le soudage, l'écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.

DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.

LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.

Si des BOUTEILLES sont endommagées, elles pourront exploser.

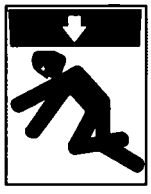
Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance

Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces infllammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s"assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.

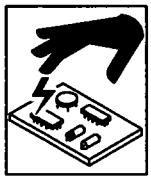


LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.

L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de recommancer le soudage.
- Ne pas obstruer les passages d'air du poste.



LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.

DES ORGANES MOBILES peuvent provoquer des blessures.

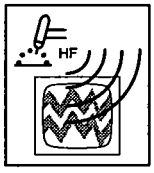
- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.

LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gachette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.

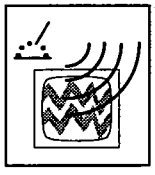
DES ORGANES MOBILES peuvent provoquer des blessures.

- Rester à l'écart des organes mobiles comme le ventilateur.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute frequence peut provoquer des interférences avec les équipements de radio–navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et et un blindage pour réduire les interférences éventuelles.



LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

1-4. Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Sandards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: "L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine". Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

1 Garder les câbles ensembles en les torsadant ou en les attachant avec du ruban adhésif.

2 Mettre tous les câbles du côté opposé de l'opérateur.

3 Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.

4 Garder le poste de soudage et les câbles le plus loin possible de vous.

5 Relier la pince de masse le plus près possible de la zone de soudure.

Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur docteur. Si vous êtes déclaré apte par votre docteur, il est alors recommandé de respecter les consignes ci-dessus.

SECTION 2 – INTRODUCTION

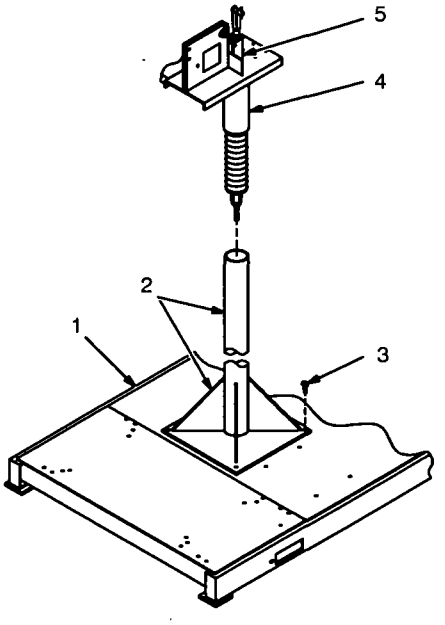
2-1. Specifications

Type of Input Power	Welding Power Source Type	Wire Feed Speed Range	Wire Diameter Range	Welding Circuit Rating	Weight
24 Volts AC Single-Phase 10 Amperes 50/60 Hertz	Constant Voltage (CV) DC For GMAW Or Constant Voltage (CV) / Constant Current (CC) DC For GMAW-P All Need 14-Pin And Contactor Control	Standard: 50 To 780 ipm (1.3 To 19.8 mpm) Optional High Speed: 92 To 1435 ipm (2.3 To 36.5 mpm)	.023 To 1/8 in (0.6 To 3.2 mm) Max Spool Weight: 60 lb (27 kg)	100 Volts, 750 Amperes, 100% Duty Cycle	12 ft (3.7 m): 207 lb (94 kg) 16 ft (4.9 m): 280 lb (127 kg)

	12 ft (3.7 m) Boom	16 ft (4.9 m) Boom
Maximum Height With 4 ft (1.2 m) Post	17 ft (5.2 m)	21 ft (6.4 m)
Vertical Lift Of Boom	Horizontal to 60° Above Horizontal	Horizontal to 60° Above Horizontal

SECTION 3 – INSTALLATION

3-1. Installing Swivel Into Pipe Post



1 Swingpak Base or CBC Cart

2 Pipe Post With Base

3 Steel Bolt

Secure as shown using as a minimum 1/2 in diameter SAE grade 5 steel bolts.

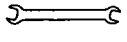
4 Swivel Assembly

Insert into pipe post. Lubricate swivel.

5 *Safety Collar*

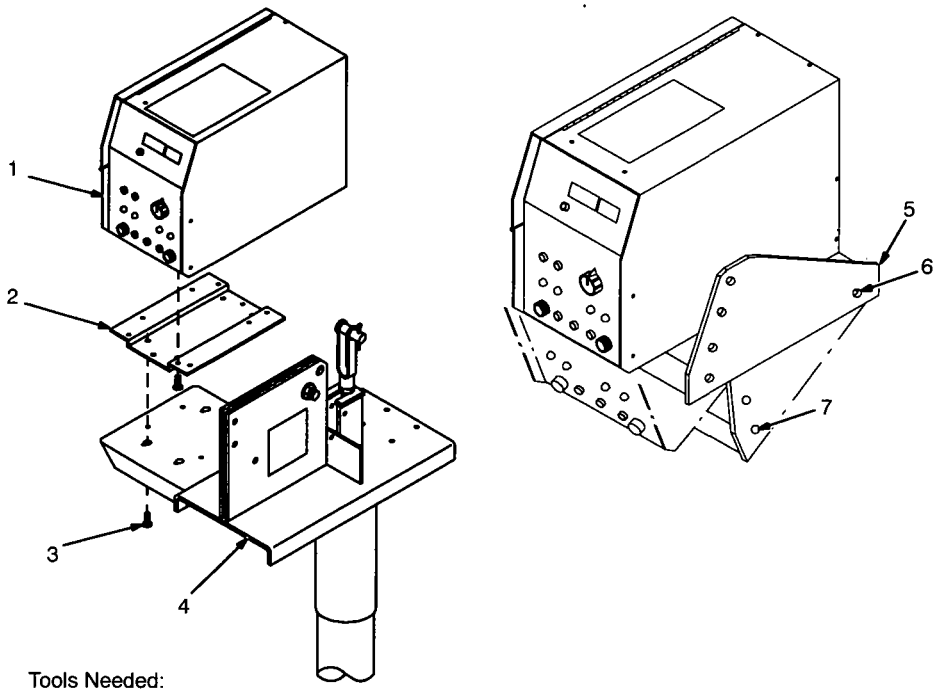
▲ **Do not remove until instructed to.**

Tools Needed:

 3/4 in

ST-152 382

3-2. Installing Control Box And Adjusting Tilt



1 Weld Control

2 Bracket

3 Screw

Bracket and screws are installed onto bottom of control at factory.

4 Swivel

Loosen screws. Place control on swivel and slide forward. Tighten screws.

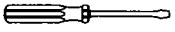
5 Tilt Bracket

6 Rear Pivot Screw

7 Front Screw

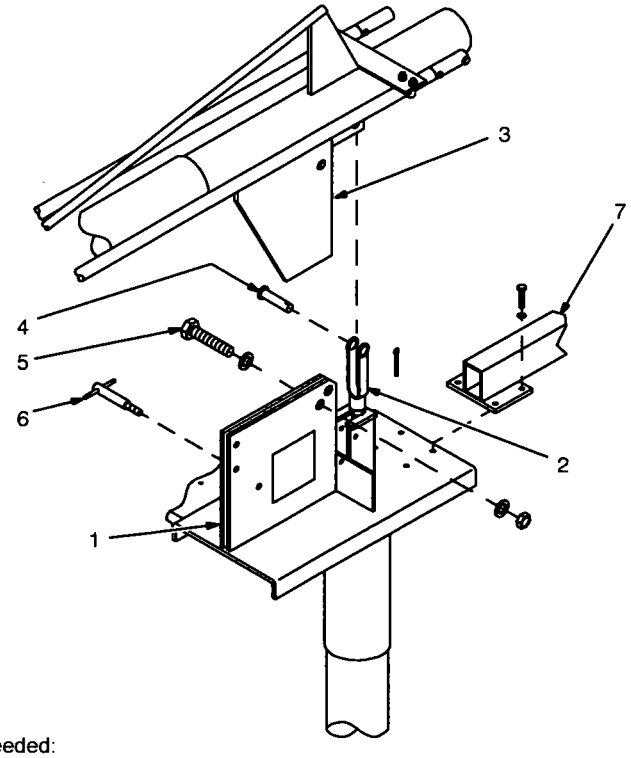
Loosen rear pivot screw. Remove front screw. Pivot control downward to desired viewing angle. Replace and tighten front screw. Tighten pivot screw.

Tools Needed:



ST-800 174 / ST-801 278

3-3. Installing Boom And Reel Support



1 Swivel Plates

2 Yoke

Remove hardware from swivel plates and yoke.

3 Boom

Set boom into swivel as shown.

4 Yoke Pin

Install pin through yoke. Install cotter pin and spread ends.

5 Bolt

Install bolt, washers, and nut. Tighten hardware, and back bolt off one half turn.

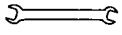
6 Locking Knob

Install locking knob but do not tighten.

7 Reel Support

Install reel support.

Tools Needed:



3/8, 3/4 in

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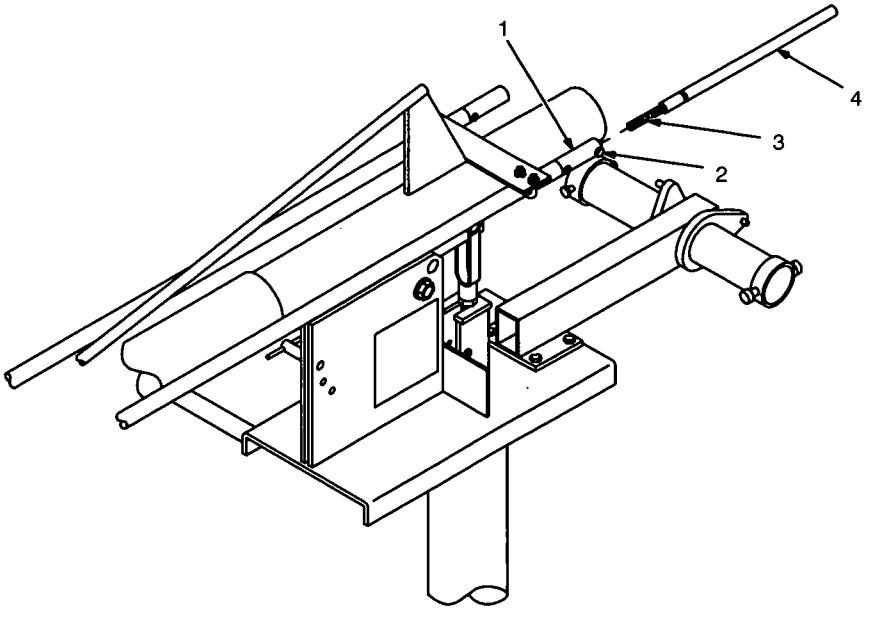
3-4. Installing Wire Guide Extension



1 Wire Guide Fitting
2 Bolt
3 Monocoil Liner
4 Wire Guide Extension

Tighten bolt to secure liner in wire guide fitting. Do not overtighten bolt and crush liner.

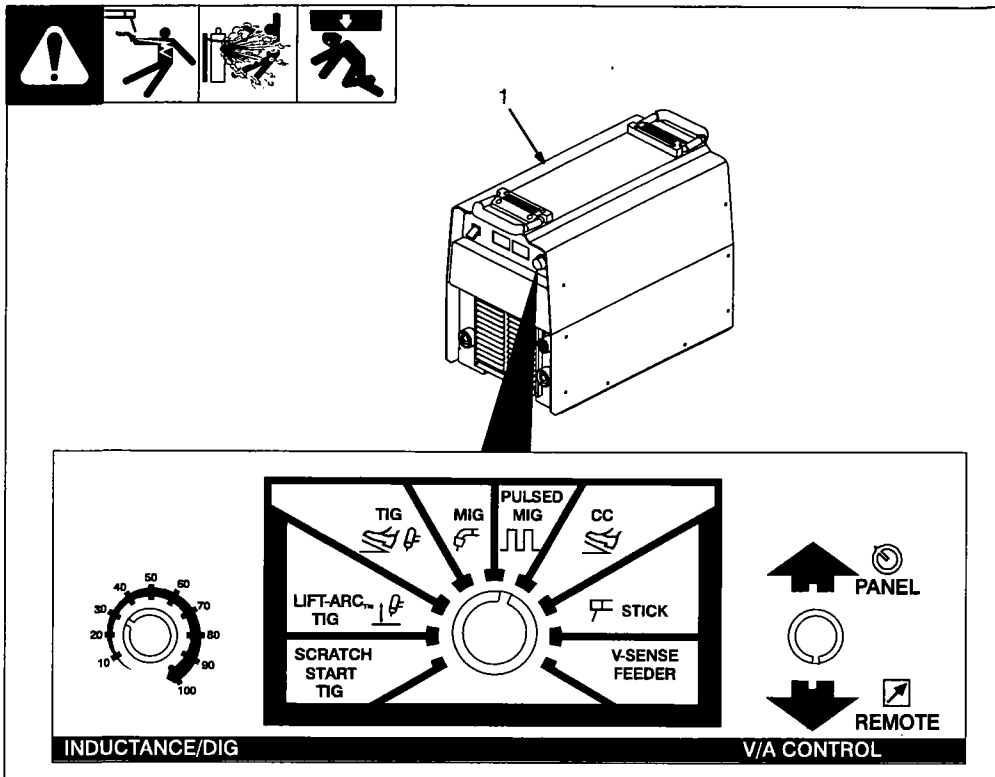
Repeat procedure for opposite side.

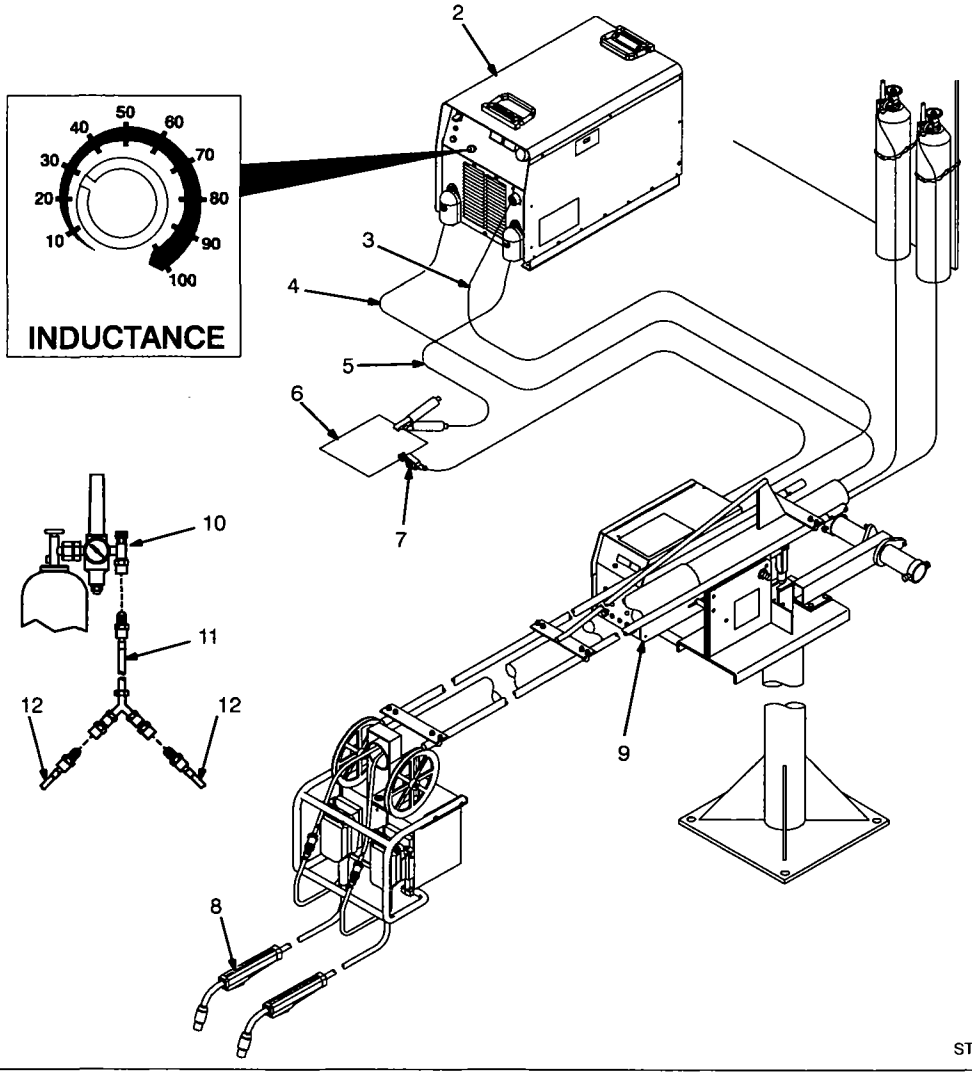
Tools Needed:

3/8 in

ST-152 383

3-5. Equipment Connection Diagram





1 300/400 Ampere Model CC/CV Inverter Welding Power Source

☞ *Use settings shown for both pulse MIG welding and MIG welding.*

2 450 Ampere Model CV Inverter Welding Power Source

3 14-Pin Cord

4 Positive (+) Weld Cable

5 Negative (-) Weld Cable

Be sure weld cables are sized properly for peak amperage if pulse welding (see welding power source Owner's Manual).

6 Workpiece

7 Voltage Sensing Lead (Optional Use)

8 Gun

Be sure gun is rated for peak amperage if pulse welding. Install according to its Owner's Manual.

9 Wire Feeder

For connections see Section 3-7.

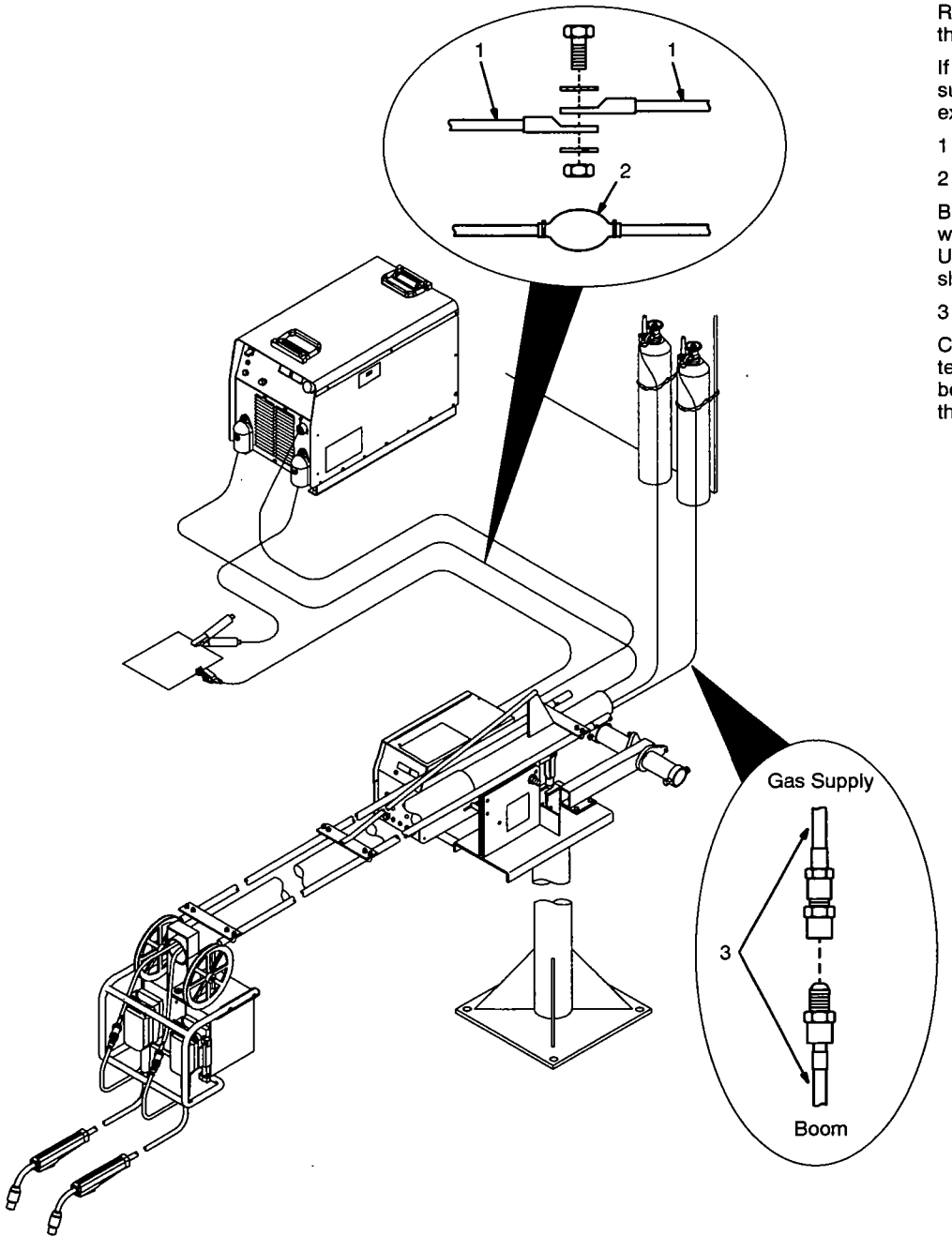
10 Shielding Gas Supply

11 Supplied Y Adapter

12 Gas Hose From Boom

ST-801 806 / Ref. ST-175 086 / Ref. ST-180 311-B

3-6. Connecting Weld Cables And Gas Hoses



The weld cables and shielding gas hoses extend 10 ft (3 m) from the boom.

Route weld cables from boom through reed relays, if applicable.

If the welding power source or gas supply are further from the boom, extend cables or hoses as follows:

1 Weld Cable

2 Insulated Sleeving

Bolt together weld cables from welding power source and boom. Use electrical tape and insulated sleeving to cover connection.

3 Shielding Gas Hose

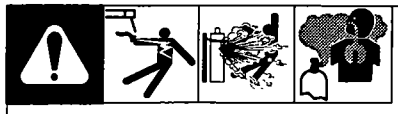
Connect hose to gas supply or extension hose. The hose from the boom has 5/8-18 right-hand threads.

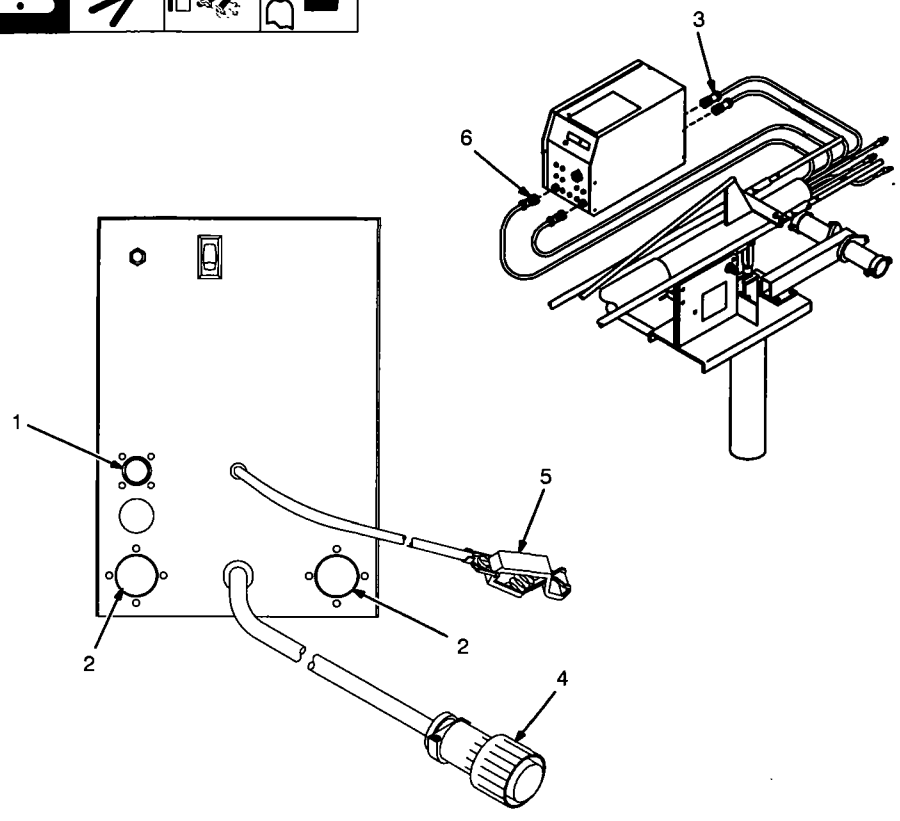
Tools Needed:

5/8 in

Ref. ST-801 806 / Ref. ST-152 800-A

3-7. Control Box Connections

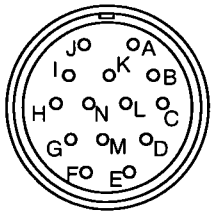




1 Optional Reed Relay Connection
2 Wire Feed Motor And Gas Valve Control Receptacle
3 Wire Feed Motor And Gas Valve Control Plug From Boom
4 14-Pin Cord
5 Volt Sense Lead (Optional Use)
6 Gun Trigger Plug From Boom

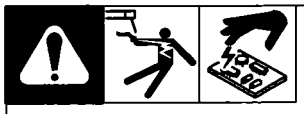
ST-800 177-A / Ref. ST-800 175

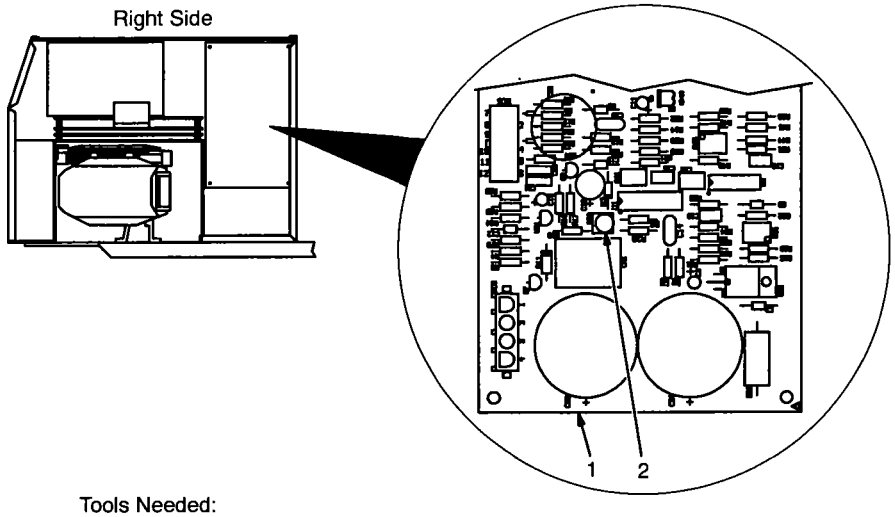
3-8. 14-Pin Plug Information

REMOTE 14	Pin*	Pin Information
	A	24 volts ac with respect to socket G.
	B	Contact closure to A completes 24 volts ac contactor control circuit.
	G	Circuit common for 24 volts AC circuit.
	C	+10 volts dc output to remote control with respect to socket D.
	D	Remote control circuit common.
	E	0 to +10 volts dc input command signal from remote control with respect to socket D.
	H	Voltage feedback; 0 to +10 volts dc, 1 volt per 10 arc volts.
	F	Current feedback; 0 to +10 volts dc, 1 volt per 100 amperes.
	M	CC/CV Select (+24 V = CV)
	N	Inductance (0-10 V)

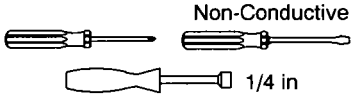
*The remaining pins are not used.

3-9. Motor Start Control





Tools Needed:



To change wire feed starting speed proceed as follows:

Turn Off wire feeder and welding power source.

Remove wrapper.

1 Motor Board PC1

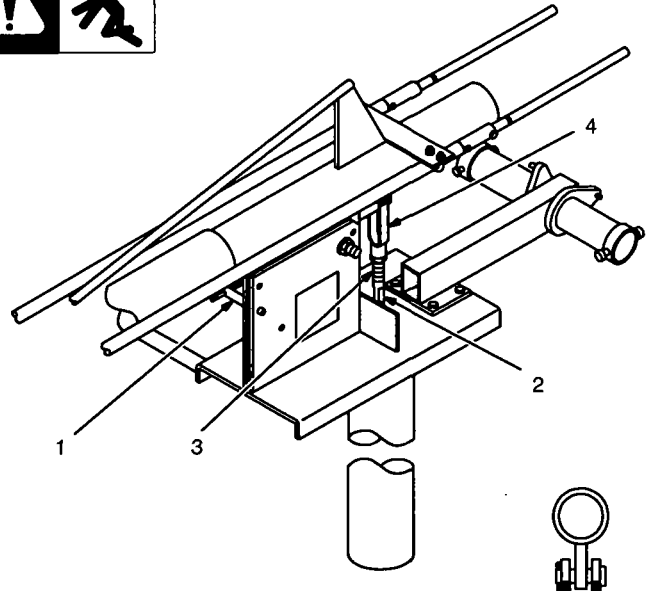
2 Motor Start Control Potentiometer R70

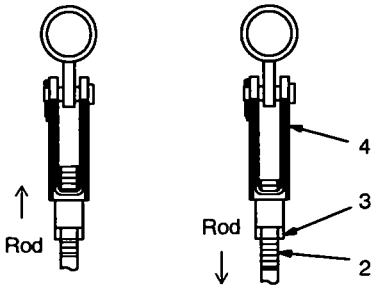
Turn potentiometer clockwise to increase time it takes the motor to ramp up to speed. Remove protective white rubber cap before making adjustment. Adjust potentiometer R70 using a small nonconductive screwdriver.

Reinstall wrapper.

ST-162 132 / Ref. SB-146 862-D

3-10. Removing Safety Collar And Adjusting Boom

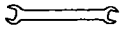




Increasing Spring Pressure For A Heavy Gun

Decreasing Spring Pressure For A Lighter Gun

Tools Needed:



1 Locking Knob

Tighten knob to prevent boom movement. Loosen knob to allow boom movement. Change knob position to limit upward movement.

Pull boom down slightly and remove safety collar. Boom should balance in any position from horizontal to 60 degrees above horizontal. If necessary, adjust boom as follows:

2 Threaded Rod

3 Jam Nut

Loosen jam nut and turn threaded rod until boom balances. Tighten jam nut. Be sure several full threads are through yoke to prevent boom falling.

4 Yoke

Retain safety collar for use in disassembling or moving boom.

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3-11. Gun Recommendation Table

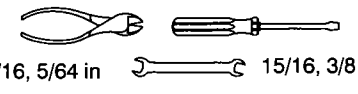
Process	Gun
GMAW-P – Hard or Cored Wires	GW-500 Or GW-600
GMAW – Hard or Cored Wires	M25, M40, Or GA-50C
FCAW – Self-Shielding Wires	GA-40GL Or GA-50GL

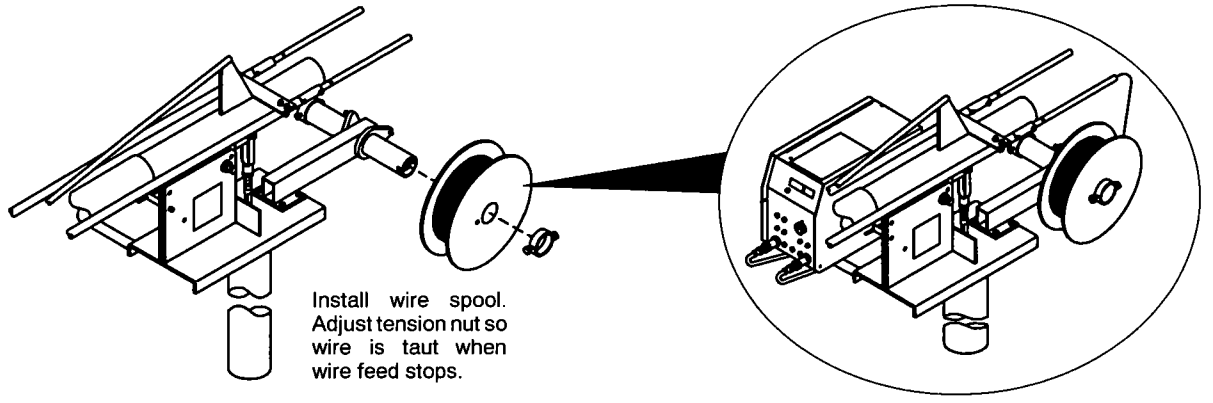
3-12. Wire Type, Size, And Feed Speed Capability Table

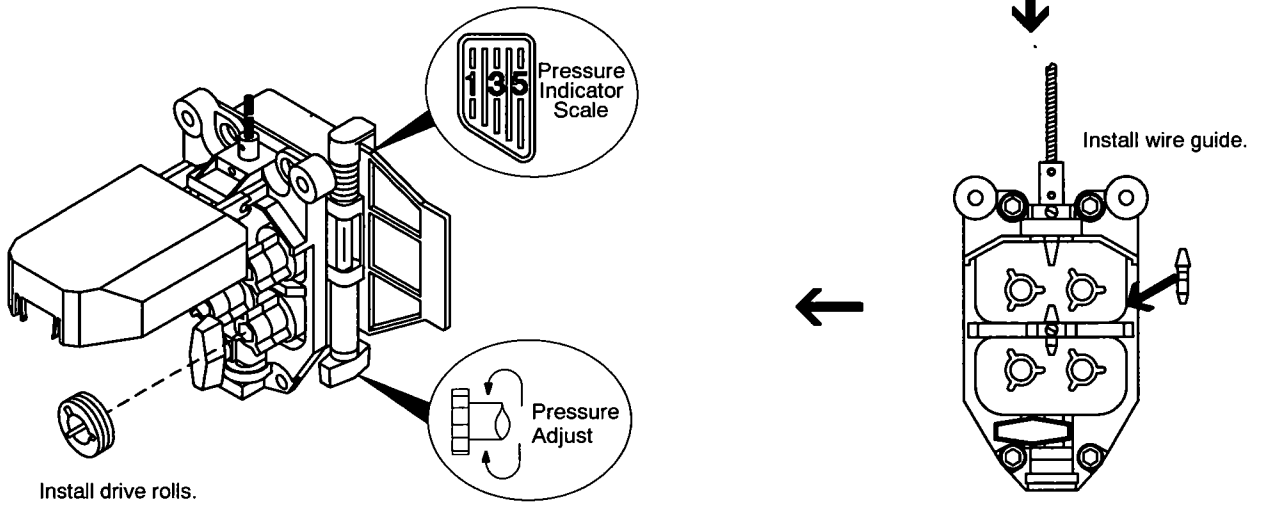
Motor Speed	Wire Type	Wire Size	Feed Speed Capability
Standard	All	.023 To 5/64 in (0.6 To 2 mm)	50 To 780 ipm (1.3 To 19.8 mpm)
Standard	All	3/32 To 7/64 in (2.4 To 2.8 mm)	50 To 700 ipm (1.3 To 17.8 mpm)
Standard	All	1/8 in (3.2 mm)	50 To 300 ipm (1.3 To 7.6 mpm)
Optional High Speed	All	.023 To 5/64 in (0.6 To 2 mm)	92 To 1440 ipm (2.3 To 35.6 mpm)

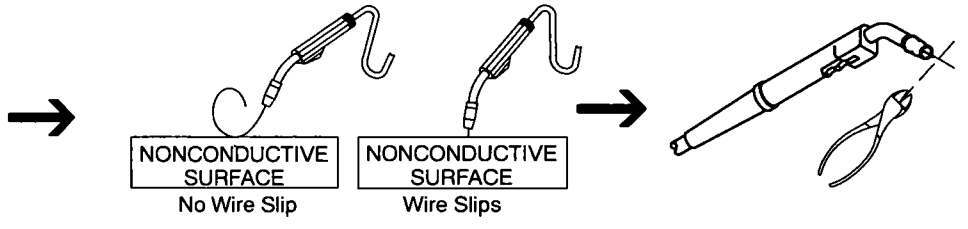
3-13. Installing And Threading Welding Wire

Tools Needed:









☞ *Be sure that outlet cable has proper size liner for the welding wire size. When installing gun, position liner extending from outlet wire guide as close as possible to drive rolls without touching.*

Install gun. Lay gun cable out straight. Cut off end of wire. Push wire through guides up to drive rolls; continue to hold wire. Press Jog button to feed wire out gun.

☞ *For soft wire or small diameter stainless steel wire, use 2 drive rolls and set drive roll pressure from 0 to a maximum of 4 on the pressure indicator scale (so that only the inner spring is compressed). This setting will generally give the best performance for these types of wires.*

To adjust drive roll pressure, hold nozzle about 2 in (51 mm) from nonconductive surface and press gun trigger to feed wire against surface. Tighten knob so wire does not slip. Do not overtighten. If contact tip is completely blocked, wire should slip at the feeder (see pressure adjustment above).

Cut wire off. Close cover.

Repeat for other side.

ST-152 564-B / Ref. ST-156 929 / Ref. SC-150 922 / Ref. ST-156 930 / S-0627-A

SECTION 4 – OPERATION

4-1. Operational Terms

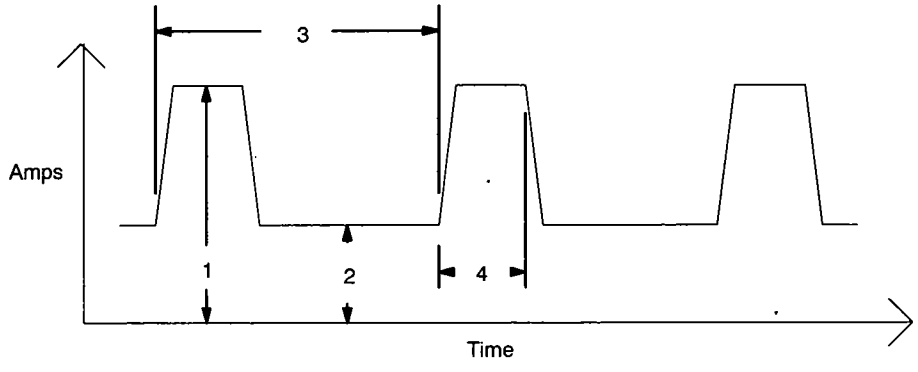
Note ☞ *See Menu Guide for detailed programming steps.*

The following is a list of terms and their definitions as they apply to this wire feeder:

General Terms:	
Adaptive Pulse Welding	The wire feeder automatically regulates pulse frequency to maintain a constant arc length, regardless of change in welding wire stickout.
Cold Wire Jog	When weld amperage is not present, wire feeds for about three seconds at set wire feed speed. Then the welding power source contactor deenergizes and wire continues to feed at the wire jog speed.
Inductance	As inductance increases, arc on time increases, and the weld puddle becomes more fluid.
Trim	Arc length adjustment in pulse welding. Increasing trim increases the actual arc length. Trim is replaced by volts in MIG programs.
Synergic	The operator programs pulse parameters for a specific wire feed speed. The wire feeder determines the pulse parameters between these wire feed speed increments.

Side Panel Terms:	
Process Mode	Is used to select the type of process to be used, including Pulse, Adaptive Pulse, or Mig.
Sequence Mode	Is used to select and program the weld sequences which include weld, crater, burnback, postflow, preflow, and run-in.
Dual Schedule Mode	Is used to select a pair of programs that can be used together.
Card Mode	Is used to select use of the optional data card storage and retrieval capabilities.
Security Mode	Only functions with a data card. Allows using the lock feature for restricting range of program parameter changing.

4-2. Pulse Welding Terms



1 Apk = Peak Amperage

Increasing Apk increases penetration.

Vpk = Peak Voltage

Arc voltage during peak current phase of the pulse waveform. This determines arc length during adaptive pulse welding.

2 Abk = Background Amperage

Maintains arc between pulses.

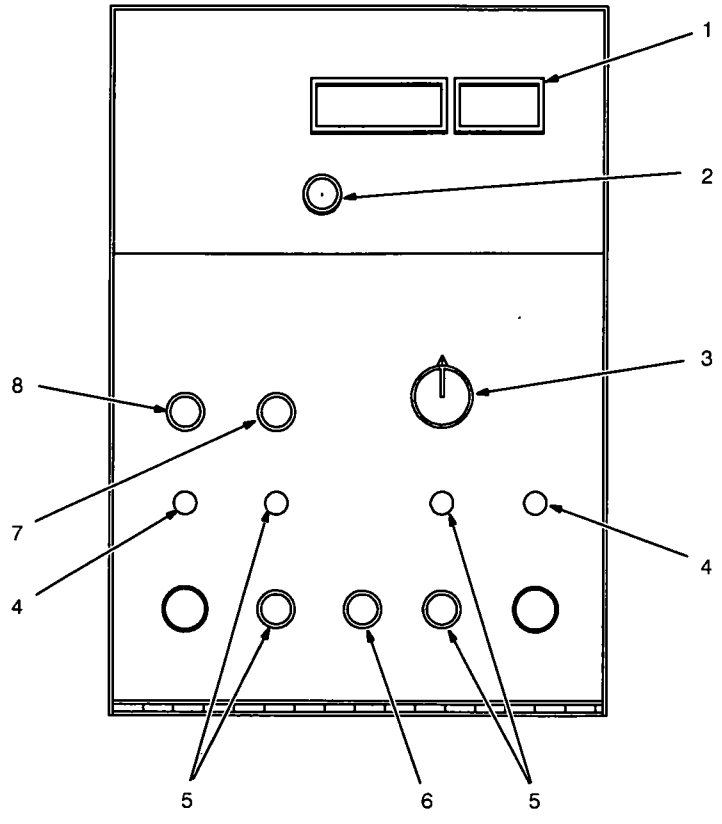
3 PPS = Pulses Per Second

Increasing PPS increases travel speed.

4 PWms = Pulse Width In Milliseconds

Increasing PWms increases bead width.

4-3. Front Panel Controls



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1 Display

2 Parameter Select Button

Press button to move > on display.

3 Display Control

Turn control to change value pointed to by >.

Turning control one click causes Trim (arc length) to increase/decrease by one or Volt to increase/decrease by 0.1.

When IPM is selected, turning control one click causes wire feed speed (IPM) to increase/decrease by one.

When MPM is selected, turning control three clicks causes wire feed speed (MPM) to increase by 0.1.

When Prg # is selected, turning control one click causes program number (Prg #) to increase/decrease by one.

The program number cannot be changed while welding, with exception of Dual Schedule Mode (see Section 6).

Pulse is a default setting. To change type of process (Pulse, Adaptive Pulse, or MIG) use side panel controls (see Section 4-4).

4 Active Side Indicator Light

5 Trigger Hold Button And Indicator Light

Trigger Hold can be set on a per program basis. Indicator light comes on for programs where this feature is active.

To weld without holding gun trigger throughout weld cycle, press and release button to turn feature on (indicator light turns on).

To start weld cycle, press and release gun trigger within three seconds after an arc has been struck. To end weld cycle, press and release gun trigger.

6 Side Select Button

The feeder remembers the last used program for each side and returns to that program when the active side is changed.

☞ *The gun trigger may be used to change active side of the feeder.*

7 Jog Button

Push to momentarily feed welding wire without energizing welding circuit or shielding gas valve.

Jog speed is varied using the Display Control while Jog button is pressed. Default setting is 200 IPM.

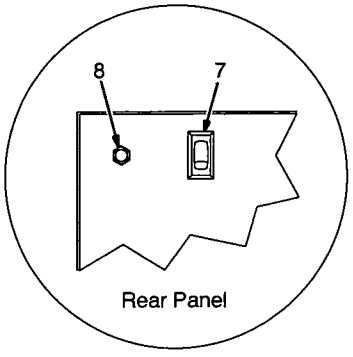
8 Purge Button

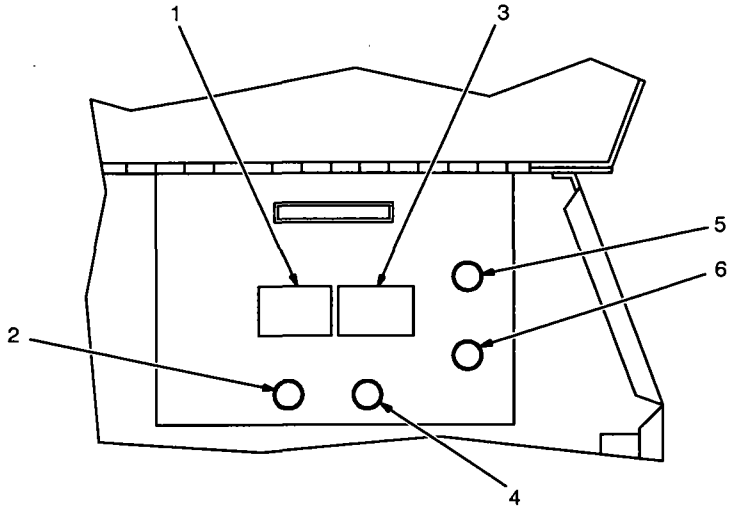
Push to momentarily energize gas valve without energizing the welding circuit.

☞ *Jog and Purge only work on the active side of the feeder.*

Holding the Jog and Purge buttons at the same time displays pulse parameters on the side panel display and voltage on front panel display.

4-4. Side And Rear Panel Controls





1 Mode Display
2 Mode Select Button

Press button to move > in display.

3 Parameter Display
4 Parameter Select Button

Press button to move > in display.

5 Parameter Increase Button
6 Parameter Decrease Button
7 Power Switch
8 Circuit Breaker CB1

CB1 protects the wire feeder from overload.

Ref. ST-162 128 / Ref. ST-162 133

SECTION 5 – SETTING SEQUENCE PARAMETERS

5-1. Sequence Parameters In A Program

☞ *See Menu Guide for detailed programming steps.*

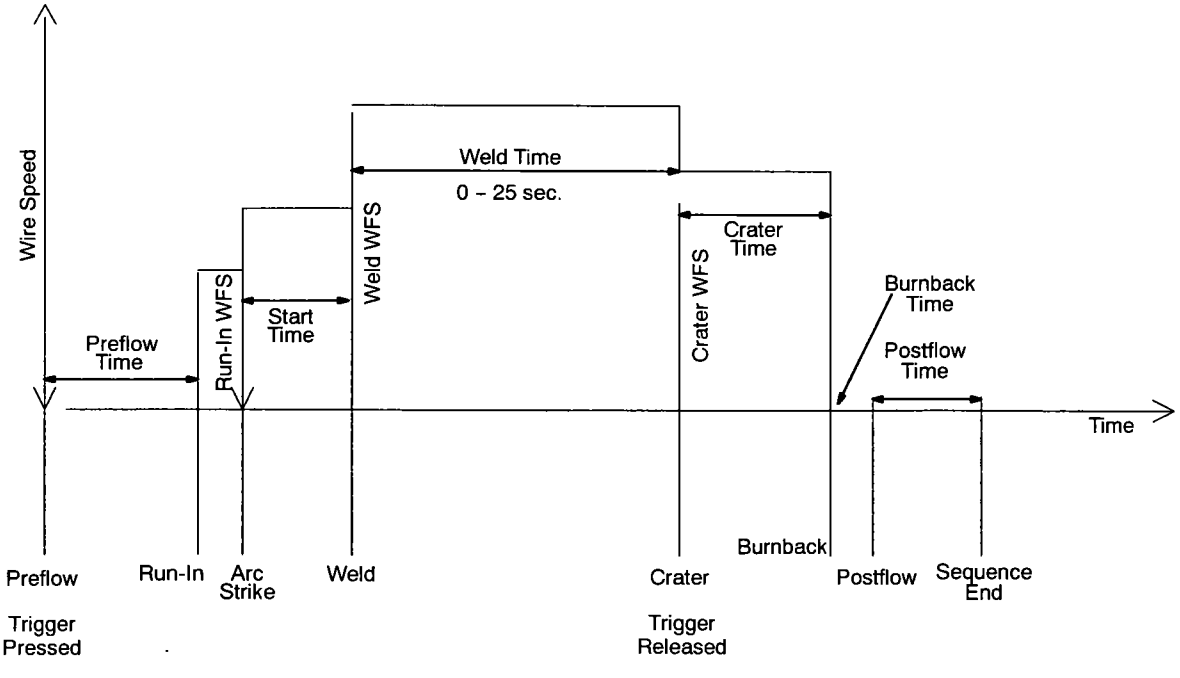
Trim is arc length. If set to zero, arc length is short. If set to 99, arc length is long.

If time is set to zero in Weld sequence, welding continues until gun trigger is released.

If time is set to zero in any timed sequence except Weld, the sequence is skipped.

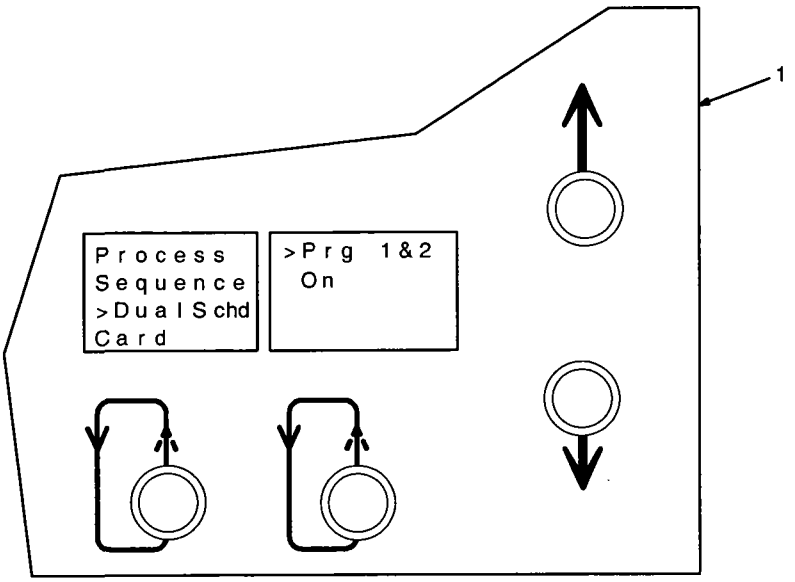
		Trim 0-99	Volts 10.0-38.0	Inductance 0-99%	IPM 50-780	Seconds
1. Weld	Pulse	X			X	0-25.0
	MIG		X	X	X	
2. Crater	Pulse	X			X	0-2.50
	MIG		X		X	
3. Burnback	Pulse					0-0.25
	MIG		X			
4. & 5. Postflow/ Preflow						0-9.9
6. Run-In					5-780	
6. Start	Pulse	X			X	0-2.50
	MIG		X		X	

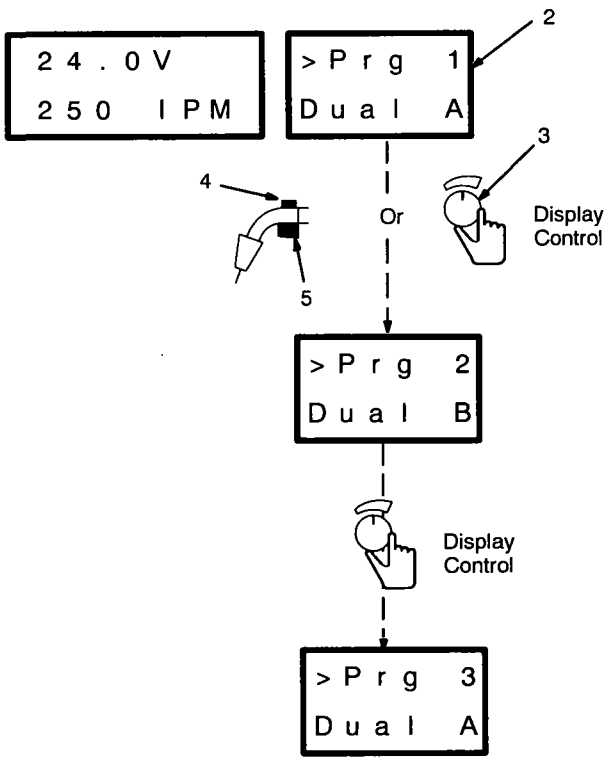
X = Setting available.



SECTION 6 – SETTING DUAL SCHEDULE PARAMETERS

6-1. Selecting Dual Schedule Pair





Dual Schedule is used with two consecutive weld programs 1 & 2, 3 & 4, 5 & 6, or 7 & 8. Any program type (MIG, Adaptive Pulse, or Pulse) can be combined in dual schedule.

1 Side Panel Display

Use side panel to turn feature on. See Menu Guide for detailed programming steps.

2 Front Panel Display

Press front panel parameter select button to select program number.

3 Front Panel Display Control

4 Dual Schedule Switch (See Section 6-2)

☞ *Switch type is set in System Setup.*

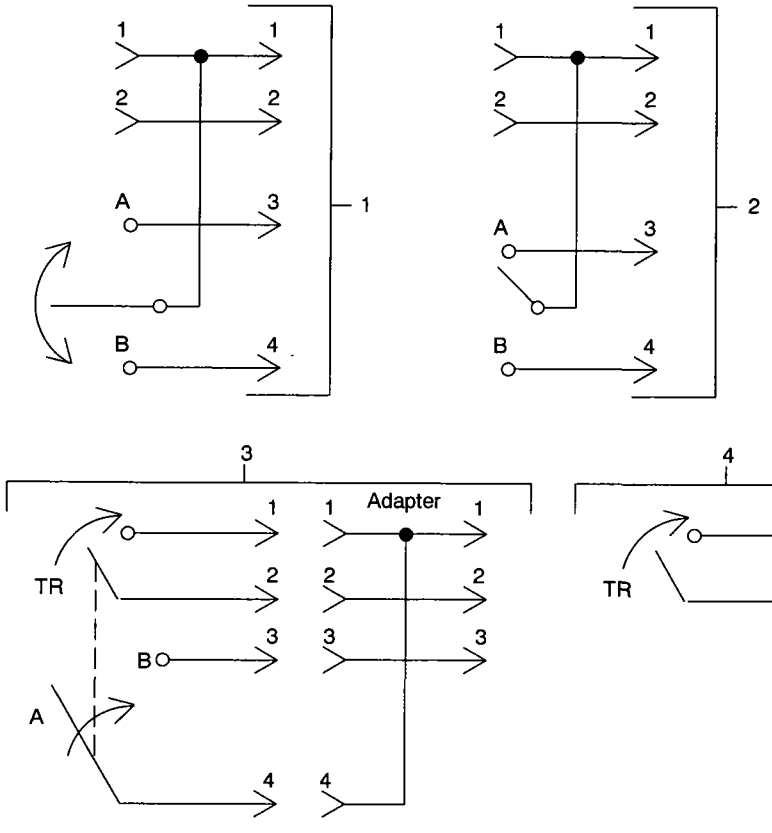
5 Welding Gun Trigger

Selecting dual schedule program A or B is done by using Display Control, dual schedule switch, or gun trigger (depending on system setup).

When program B is active, turn Display Control one click clockwise to select another pair of dual schedule programs.

☞ *Programs can be rearranged in desired order using the data card. See Section 7.*

6-2. Dual Schedule Switch Diagrams



1 Momen 2P (Momentary-Contact 2-Pole Switch Or DSS-10)

2 Maint 2P (Maintained-Contact 2-Pole Switch Or DSS-9M)

3 Maint 1P (Maintained-Contact 1-Pole Switch, Or DSS-8)

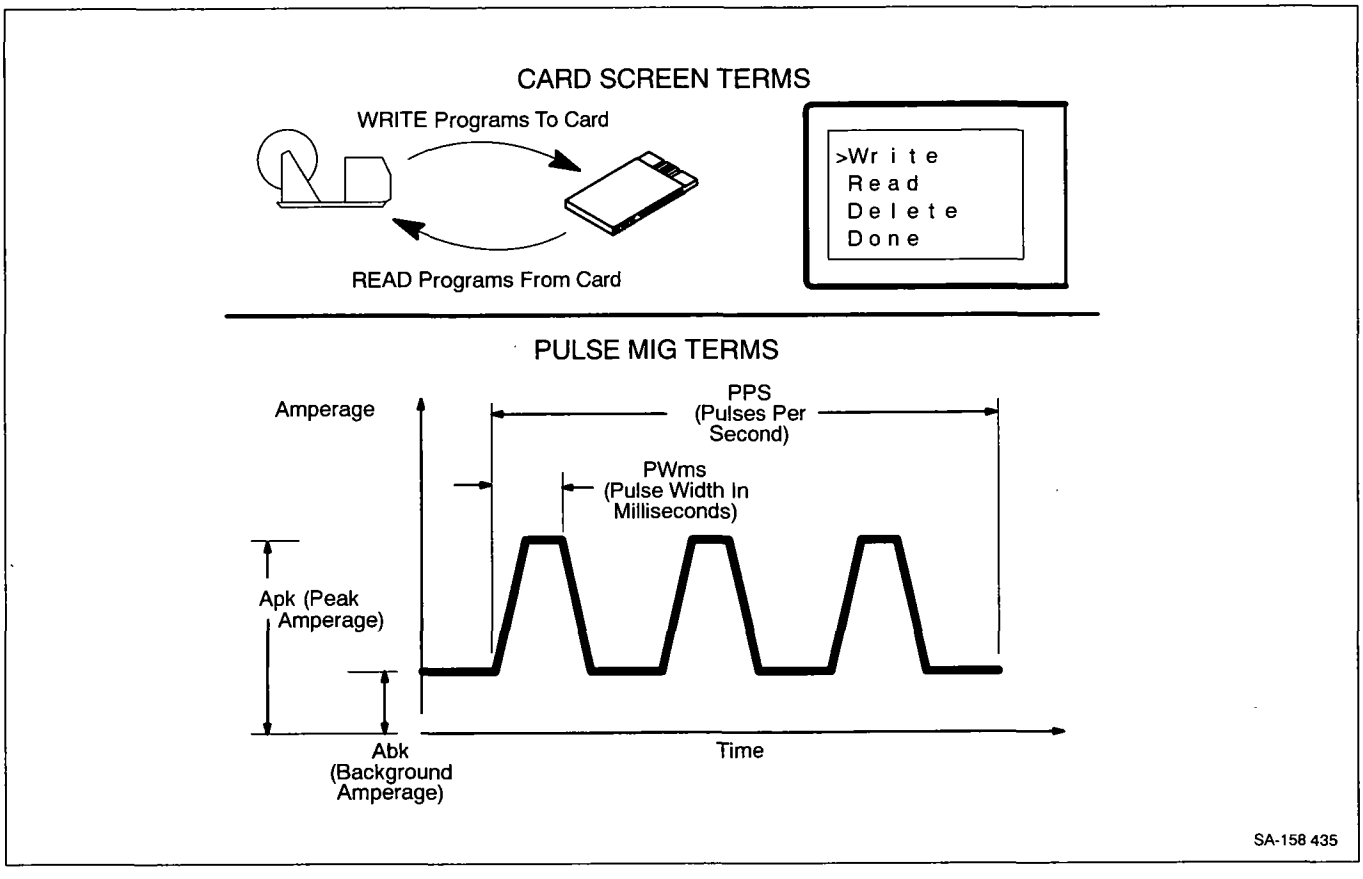
4 Trigger

Allows dual scheduling after establishing a welding arc.

☞ *If trigger is used for dual schedule switch, Trigger Hold is disabled.*

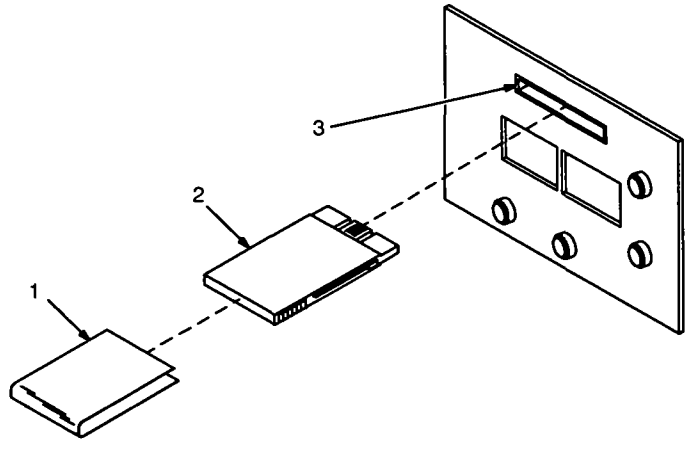
SECTION 7 – USING THE OPTIONAL DATA CARD

7-1. Data Card Terms



SA-158 435

7-2. Installing Data Card



1 Label

Apply label to data card. Write program information on label.

2 Data Card

3 Card Slot

For Blank Data Card:

Insert card into slot. To format card, turn On power. Select Card from menu. Data card formats when unit enters Card mode.

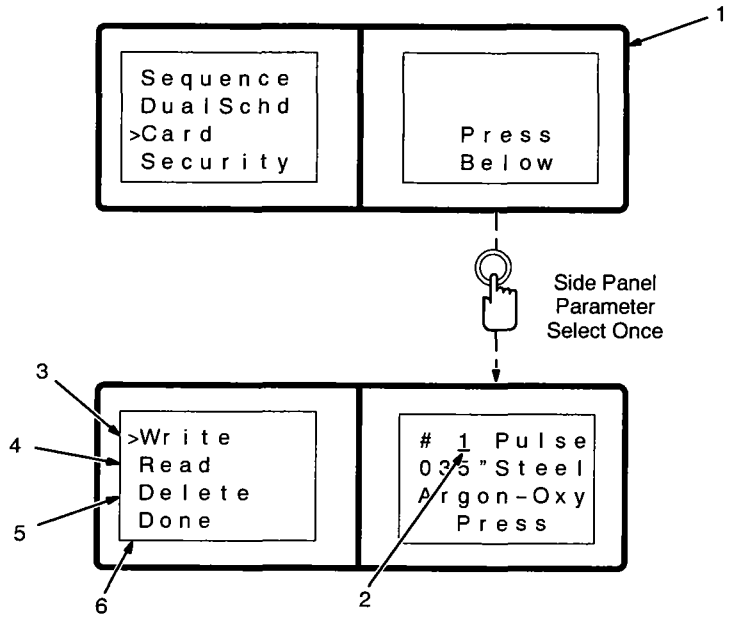
For Power Source Data Card:

Insert card into slot. Turn On power. Push Parameter Select button within 3 seconds and the 8 programs and setup information are read into the wire feeder memory.

Unit is ready to use when "Please Wait" message disappears from front panel display.

ST-156 266-B

7-3. Card Displays



☞ *See Menu Guide for detailed programming steps. Security mode only functions with a data card.*

1 Card Display

2 Moving Line

Moving line is under value that can be changed.

3 Write

Transfers program data from unit to card. The program card can hold up to 32 programs. When writing to the card, the next available program number is automatically assigned.

4 Read

Transfers program data from card to unit.

5 Delete

Deletes program data from card.

6 Done

Exits card display.

SECTION 8 – SYSTEM SETUP

8-1. System Setup Display Parameters

Note ☞ *See Menu Guide for detailed programming steps.*

DISPLAY SETTING	NOTES
>System *	Select the process the welding power source is able to do.
>Range *	Welding power source minimum and maximum voltage values are always needed. Amperage values are required for pulse welding. Set values to match welding power source ranges.
>Access◆	When on, restricts use of setup screens.
>Mig Type	Default is Off. Set to On only for older CV welding power source without voltage feedback at 14-socket receptacle.
>Voltage	Default is 14-pin receptacle. Use V. Sense when more than 50 ft (15m) of weld cable is used (including gun cable length).
>Arc Start**	Use Hot Start only with 450 Ampere Inverter Model welding power source and large diameter wires. The arc starts in CV and switches to CC.
>Dual Schedule	See Section 6-2.
>Trigger	When on, trigger can be used to switch between programs that have at least 0.2 seconds of preflow time programmed.
>Remote	When on, a DSS-10 can be used to change Volts or Trim, IPM, or Prg depending on where the front panel display > is.
>Arc Time	Displays accumulated arc time and cycles.
>Wire Feed	Choose to display inches per minute or meters per minute and motor type, but installed motor must match selection.
>Model**	Pulse programs differ between bench and boom models.
>Memory	Program Reset: unit defaults to original factory setting for the last active program. Setup information does not change. If setup card is in card slot, program will be loaded from card. System Reset: unit defaults to original factory settings for all programs and setup excluding System, Arc Time, and Model. If setup card is in card slot, program will be loaded from card.
>Shutdown	When on, the system immediately shuts down if no arc voltage is sensed. When off, wire feeds even if no arc voltage is sensed.
>Teach	Default is 15 points, but can be set to 4 points.
>Gas Flow◆◆	Setting must be Meter Off if option is not installed.
>Software	Know this when talking with service personnel.

* Automatically set if power source data card is used.
◆ Can be used only when optional data card is inserted.
** Selection does not appear on display when MIG Only is System choice.
◆◆ Must remain set to Meter Off if option is not installed to prevent system error.

SECTION 9 – STANDARD PULSE WELDING PROGRAMS

Note ☞ *Apk = Peak Amperage, Vpk = Peak Voltage, Abk = Background Amperage, PPS = Pulses Per Second, PWms = Pulse Width (milliseconds). Four teach points were used for factory set programs. If selection is set for fifteen teach points, the remaining points are interpolations from the 4 taught points.*

9-1. Program 1 – Steel

Wire Size/Type: .035"			Gas: Ar - CO_2 or Ar - Oxy / 40 CFH (19 L/m)			
IPM / MPM	**Apk**	**Vpk**	**Abk**	**PPS**	**PWms**	**COMMENTS**
700 / 17.8	440	36.7	160	180	2.9	
400 / 10.2	385	32.4	108	126	2.3	
200 / 5.1	335	28.7	61	81	2.0	
100 / 2.5	328	27.4	37	47	1.7	

9-2. Program 2 – Steel

Wire Size/Type: .045"			Gas: Ar - CO_2 or Ar - Oxy / 40 CFH (19 L/m)			
IPM / MPM	**Apk**	**Vpk**	**Abk**	**PPS**	**PWms**	**COMMENTS**
700 / 17.8	518	37.6	195	205	3.6	
400 / 10.2	476	36.1	157	168	3.0	
200 / 5.1	412	30.3	93	106	2.4	
100 / 2.5	375	27.7	50	66	2.2	

9-3. Program 3 – Steel

Wire Size/Type: .052"			Gas: Ar - CO_2 or Ar - Oxy / 40 CFH (19 L/m)			
IPM / MPM	**Apk**	**Vpk**	**Abk**	**PPS**	**PWms**	**COMMENTS**
625 / 15.9	560	39.3	200	229	3.6	
400 / 10.2	525	36.2	148	189	3.5	
200 / 5.1	475	31.7	102	131	2.7	
100 / 2.5	445	29.6	50	80	2.4	

9-4. Program 4 – Steel

Wire Size/Type: .062"			Gas: Ar - CO_2 or Ar - Oxy / 40 CFH (19 L/m)			
IPM / MPM	**Apk**	**Vpk**	**Abk**	**PPS**	**PWms**	**COMMENTS**
400 / 10.2	580	36.6	200	200	4.3	
300 / 7.6	539	34.8	160	200	4.2	
200 / 5.1	499	31.5	121	170	3.6	
100 / 2.5	460	28.3	69	118	2.6	

9-5. Program 5 – Stainless

Wire Size/Type: .035"			Gas: Ar - He - CO_2 / 40 CFH (19 L/m)			
IPM / MPM	Apk	Vpk	Abk	PPS	PWms	COMMENTS
700 / 17.8	403	33.9	132	191	2.8	
400 / 10.2	318	31.6	87	146	2.4	
200 / 5.1	295	28.5	53	94	1.9	
100 / 2.5	280	26.0	32	45	1.8	

9-6. Program 6 – Stainless

Wire Size/Type: .045"			Gas: Ar - He - CO_2 / 40 CFH (19 L/m)			
IPM / MPM	Apk	Vpk	Abk	PPS	PWms	COMMENTS
700 / 17.8	480	39.0	200	227	3.2	
400 / 10.2	425	32.4	155	185	2.5	
200 / 5.1	360	28.0	100	115	2.0	
100 / 2.5	350	26.2	40	70	2.0	

9-7. Program 7 – Nickel Alloy

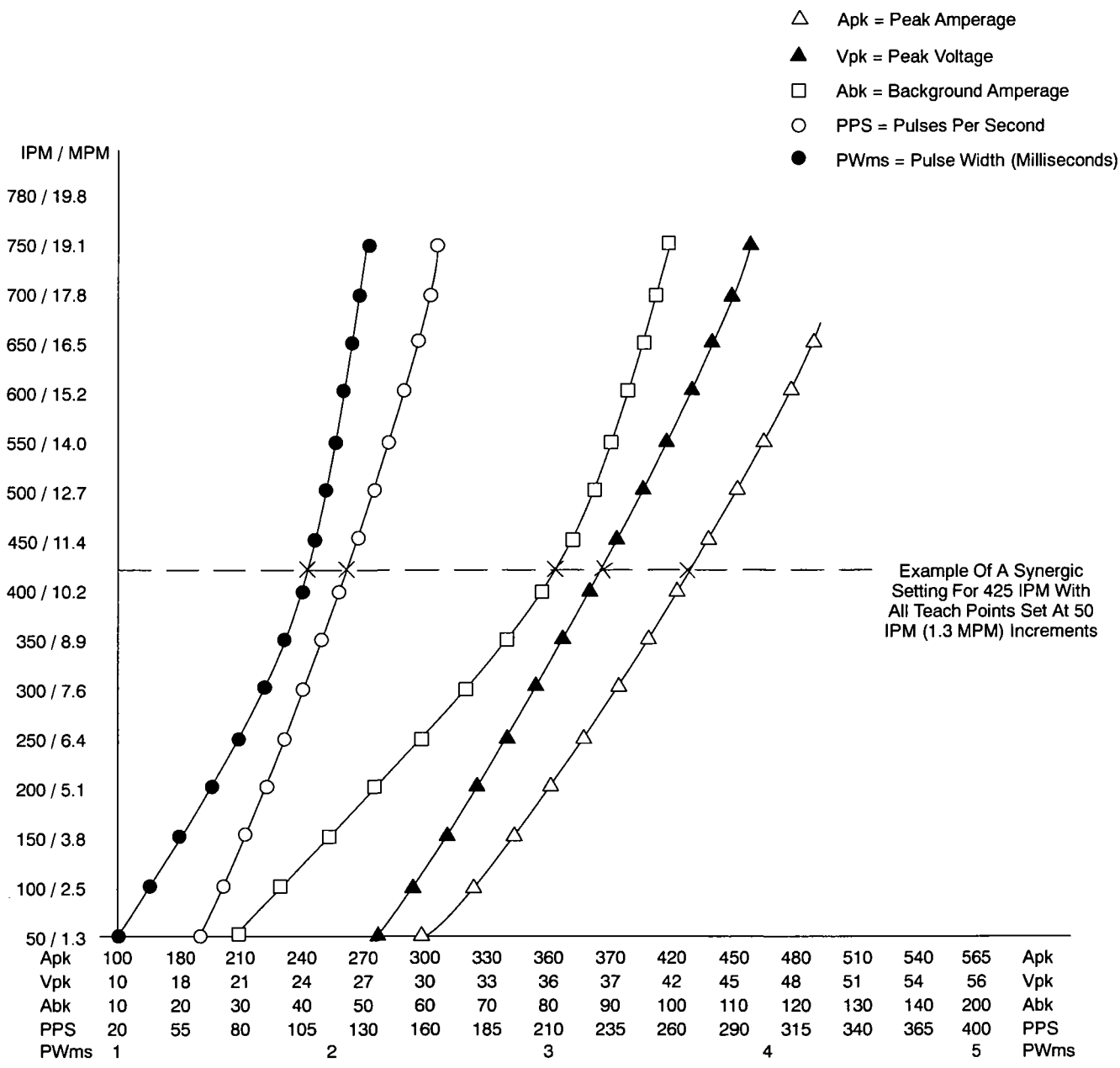
Wire Size/Type: .035" Nickel Alloy			Gas: Ar - He / 40 CFH (19 L/m)			
IPM / MPM	Apk	Vpk	Abk	PPS	PWms	COMMENTS
700 / 17.8	350	34.5	130	144	3.7	
400 / 10.2	310	30.0	80	105	3.3	
200 / 5.1	280	27.5	48	55	2.9	
100 / 2.5	260	25.1	28	36	2.5	

9-8. Program 8 – Silicon Bronze

Wire Size/Type: .035" SiBr			Gas: Argon / 40 CFH (19 L/m)			
IPM / MPM	Apk	Vpk	Abk	PPS	PWms	COMMENTS
510 / 13.0	340	30.7	100	125	3.7	
400 / 10.2	310	29.8	83	97	3.4	
200 / 5.1	277	26.6	48	55	3.0	
120 / 3.1	242	25.2	31	31	3.0	

SECTION 10 – TEACH POINTS

10-1. Teach Using 15 Points

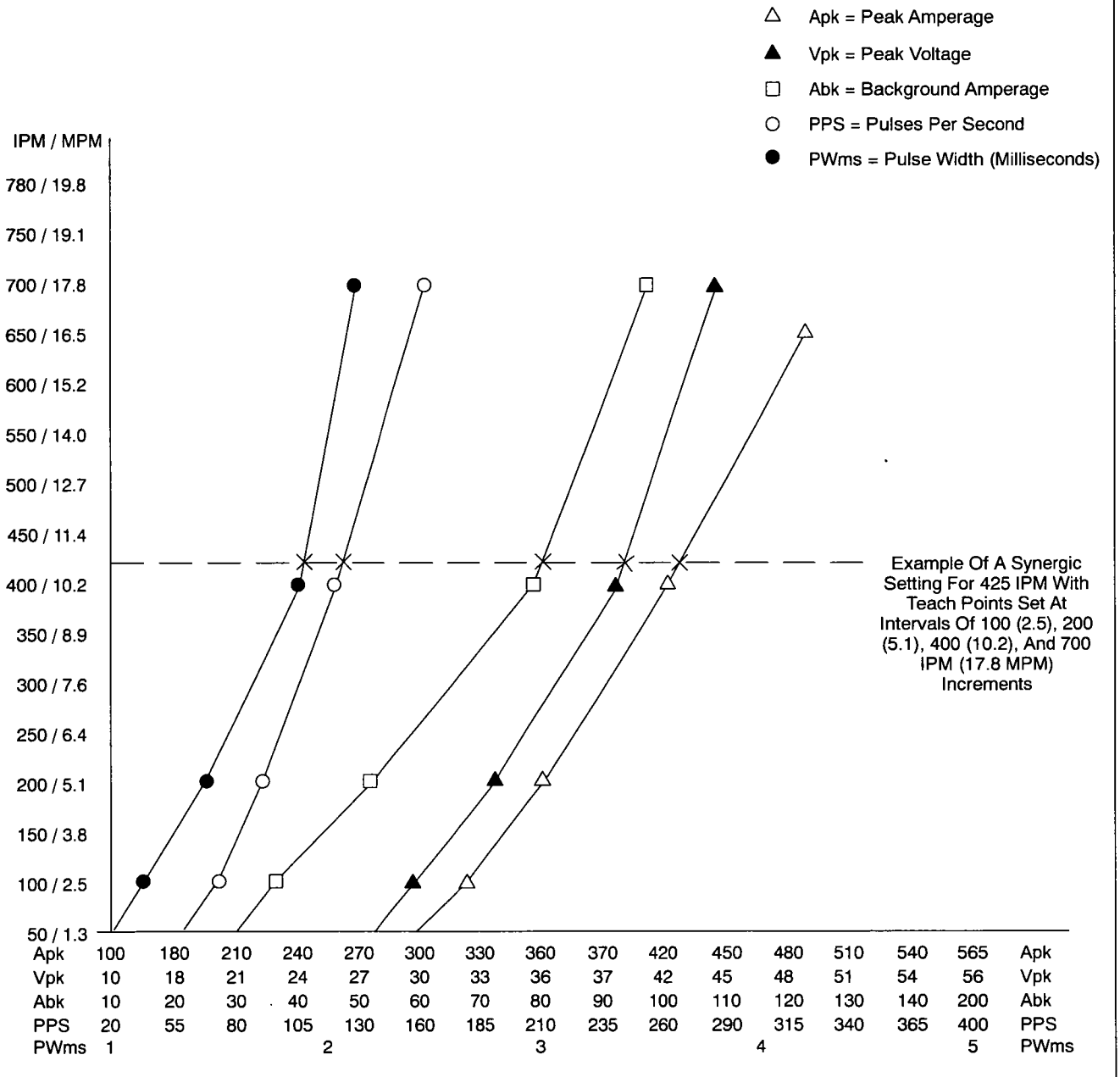


The teach mode allows the user to create custom pulse programs. The teach mode selection for 15 teach points gives a more defined curve for a specific range. At each teach point, the user can adjust five parameters to shape the pulse waveform of the weld output. The six parameters are: IPM (MPM), Apk, Vpk, Abk, PPS, and PWms.

Apk, Vpk, Abk, PPS, and PWms acting together provide the energy necessary to burn off welding wire at a set wire feed speed. The graph below shows that as wire feed speed increases, energy increases (Apk, Vpk, Abk, PPS, and PWms acting synergically).

Under some conditions, the wire feeder limits wire feed speed to maintain all pulse parameters within the capability of the system.

10-2. Teach Using 4 Points



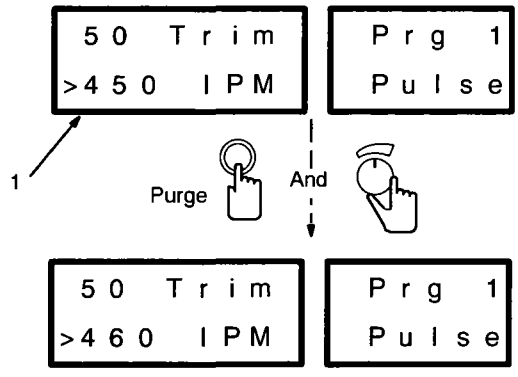
The teach mode allows the user to create custom pulse programs. The teach mode selection for 4 teach points gives the whole welding range quickly. At each teach point, the user can adjust five parameters to shape the pulse waveform of the weld output. The six parameters are: IPM (MPM), Apk, Vpk, Abk, PPS, and PWms.

Apk, Vpk, Abk, PPS, and PWms acting together provide the energy necessary to burn off welding wire at a set wire feed speed. The graph below shows that as wire feed speed increases, energy increases (Apk, Vpk, Abk, PPS, and PWms acting synergically).

Under some conditions, the wire feeder limits wire feed speed to maintain all pulse parameters within the capability of the system.

10-3. Redefining Teach Points

Redefining IPM Teach Point



1 IPM

IPM determines the weld metal deposition rate.

☞ *Redefining IPM is not normally required unless special wire or unusual joint design is needed.*

Use front panel parameter select button to move > to select IPM. Use Display Control to select teach point value.

Press and hold Purge button while turning Display Control to redefine the ipm teach point. For example: there are teach points at 150, 200, and 250 ipm; the teach point at 200 can be adjusted to a wire feed speed of 151 to 249 ipm.

2 Apk – Peak Amperage

3 Abk – Background Amperage

Peak and background amperage depend on the range of the welding power source.

4 PPS – Pulses Per Second Of 20-400

5 PWms – Pulse Width Of 1.0-5.0 Milliseconds

Use side panel controls to change pulse parameters. See Menu Guide for detailed programming steps.

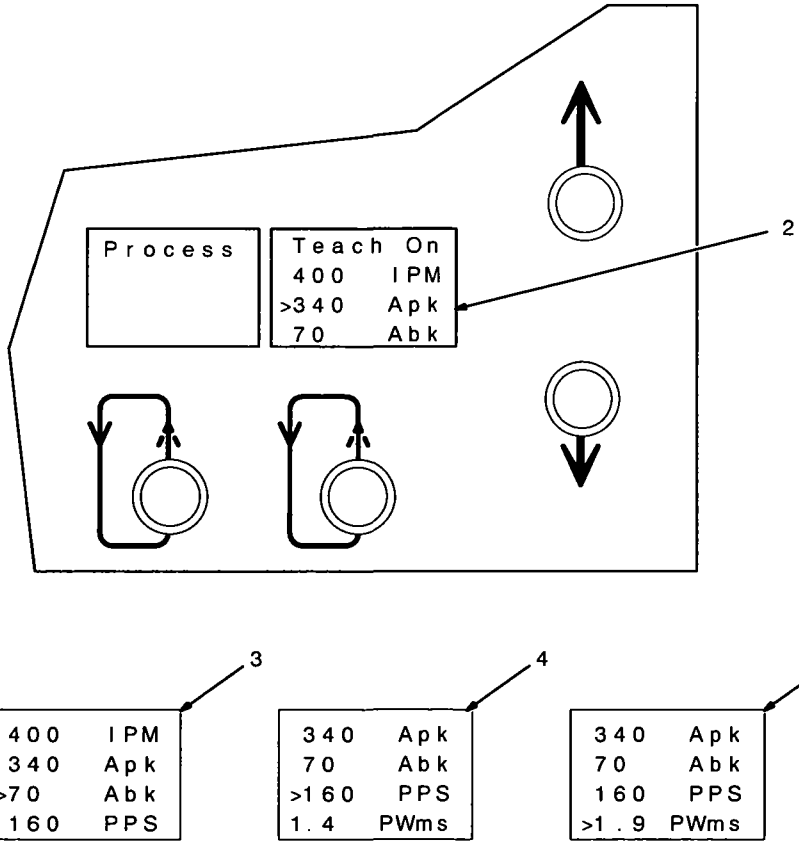
After values are set, strike and maintain an arc for five seconds. Do this for each teach point.

End weld by releasing gun trigger, not by pulling gun out of weld. Repeat for each custom teach point.

The taught arc length represents a Trim (arc length) setting of 50.

Once the teach points are set, the wire feeder adjusts parameters between teach points synergically.

Redefining Pulse Parameters



Ref. S-0259 / Ref. ST-154 109

Date_____ Program Number_____ Wire Size/Type_____

Gas_____ Flowrate_____CFH(L/min)

Equipment Used – Power Source____ Serial Number_____

Wire Feeder_____ Serial Number_____

Gun Model_____ Weld Cable – Negative_____ Positive_____

Wire Manufacturer_____ Mfg. Date_____

IPM / MPM	Apk	Abk	PPS	PWms	Vpk	COMMENTS

Preflow Seconds:_____

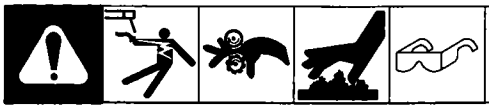
Run-In Trim/Volts:_____ IPM / MPM:_____ Seconds:_____

Crater Volts:_____ IPM / MPM:_____ Seconds:_____

Postflow Seconds:_____

SECTION 11 – MAINTENANCE AND TROUBLESHOOTING

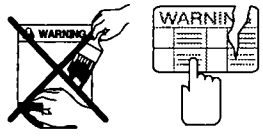
11-1. Routine Maintenance



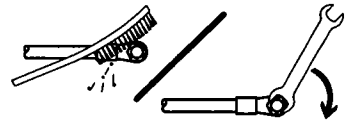
▲ **Disconnect power before maintaining.**

3 Months

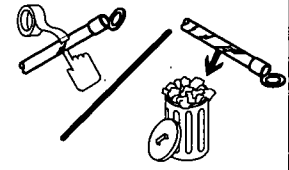
Replace unreadable labels.



Clean and tighten weld terminals.



Repair or replace cracked weld cable.

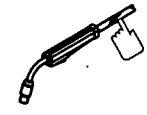


Replace cracked parts.

Check 14-pin cord.

Check gas hose and fittings.

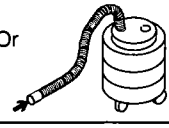
Check gun cable.



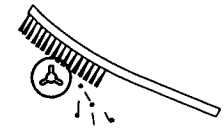
6 Months

Blow out or vacuum inside. During heavy service, clean monthly.

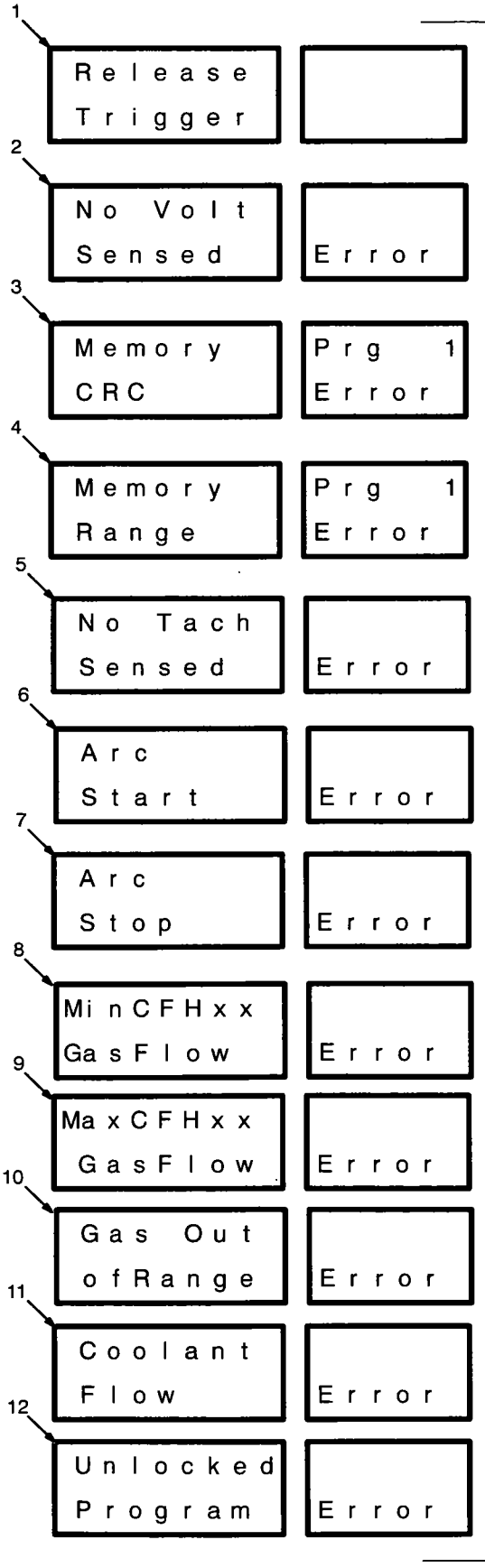
Or

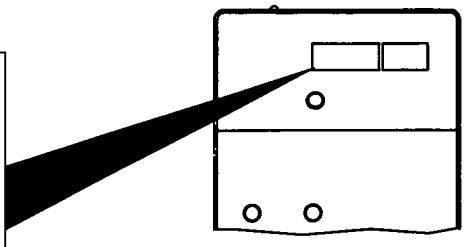


Clean drive rolls.



11-2. Error Displays





1 Release Trigger Error Display

This appears if the trigger is closed when the unit power is turned on, or if the trigger is stuck or defective.

2 No Volt Sensed Error Display

The arc voltage sense circuit is not receiving feedback. Check voltage sensing connections. Check connections at 14-position plugs/ receptacles at the unit and welding power source.

Turn unit off and back on after correcting problem.

If this error continues to occur when pulse welding, it may help to select Hot Start.

3 Memory CRC Error Display

The data in the program indicated is not the same data that was saved.

Perform a system reset.

4 Memory Range Error Display

The data in the program indicated is out of usable range.

Go through pulse parameters to make sure they do not exceed settings of the Range display or perform a system reset.

5 No Tach Sensed Error Display

The motor tach feedback is not reaching the control. Check connections.

Press front panel Parameter Select to clear error.

6 Arc Start Error Display

This appears when pulse welding and current is detected but the arc cannot be started. Check and correct program pulse parameters and voltage settings. Check voltage sensing connections.

Press front panel Parameter Select to clear error.

7 Arc Stop Error Display

This appears when pulse welding and the motor does not stop at the end of the weld. If there is high frequency being used in the area, turn it off. A motor brake circuit problem can also cause this error.

Press front panel Parameter Select to clear error.

8 Minimum Gas Flow Error

This appears when gas flow falls below the minimum CFH set (xx in example). Adjust gas flow to bring it above set value.

Press front panel Parameter Select to clear error.

9 Maximum Gas Flow Error

This appears when gas flow is above the maximum CFH set (xx in example). Adjust gas flow to bring it below set value.

Press front panel Parameter Select to clear error.

10 Gas Out Of Range Error

This appears when gas flow is greater than 100 CFH. To protect the internal sensor, the unit shuts down until the gas flow can be adjusted below 100 CFH.

11 Coolant Flow Error

This appears only when coolant flow switch option is installed. Check coolant recirculating system.

12 Unlocked Program Error Display

This appears when attempting to run an unlocked program while other programs are locked. Either lock the unlocked program or select a different program that is locked.

Ref. ST-155 222

11-3. Troubleshooting

▲ **Disconnect power before troubleshooting**

Trouble	Remedy
Wire feeds, shielding gas flows, but electrode wire is not energized.	Check interconnecting cord connections. If secure, check cord for continuity and repair or replace (see Sections 3-5 and 3-7).
Wire feeder is on, meter(s) do not light up, motor does not run, gas valve and welding power source contactor do not pull in.	Check and reset CB1 (see Section 4-4).
Electrode wire feeding stops or feeds erratically during welding.	Check gun trigger connection. See gun Owner's Manual.
	Check gun trigger. See gun Owner's Manual.
	Readjust hub tension and drive roll pressure (see Section 3-13).
	Change to correct size drive roll (see Table 13-1).
	Clean or replace dirty or worn drive roll.
	Incorrect size or worn wire guides.
	Replace contact tip or liner. See gun Owner's Manual.
	Remove weld spatter or foreign matter from around nozzle opening.
	Have Factory Authorized Service Agency check drive motor or motor control board PC1.
Motor runs slowly.	Check for correct input voltage.
Wire does not feed until trigger is pulled, but continues to feed after trigger is released, and trigger hold is not on.	Check for a short between welding gun trigger leads and weld cable. Repair short or replace welding gun.
Gas valve in feeder is rattling loudly along with possible erratic or slow wire feed speed.	Check for a short between welding gun trigger leads and weld cable. Repair short or replace welding gun.
Unit does not switch out of Run-In Speed.	Install, reconnect, or replace voltage sensing lead.
Wire feeder power is on, displays light up, but unit is inoperative.	Check welding gun trigger leads for continuity, and repair leads or replace gun.

Notes

SECTION 12 – ELECTRICAL DIAGRAM

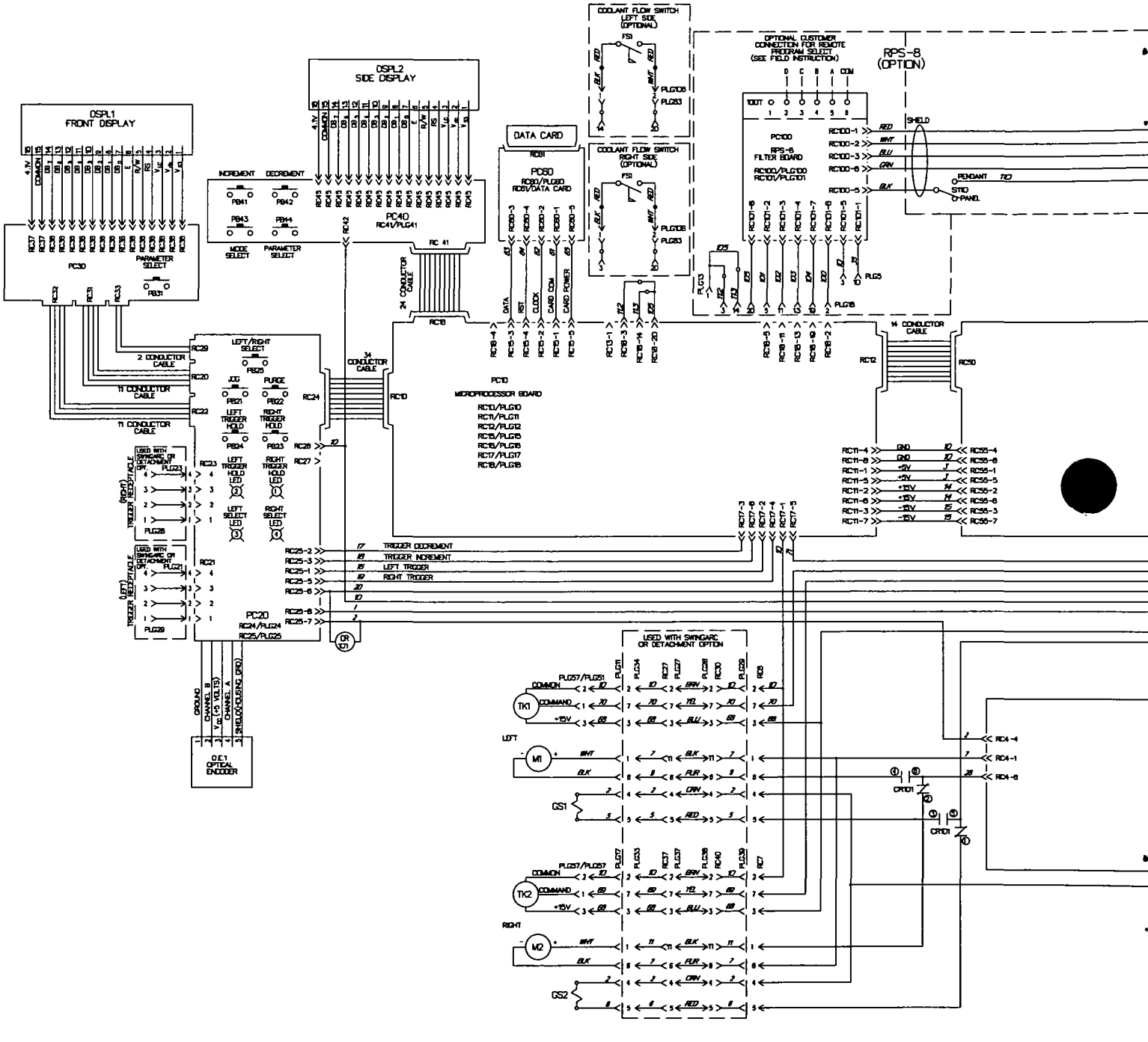
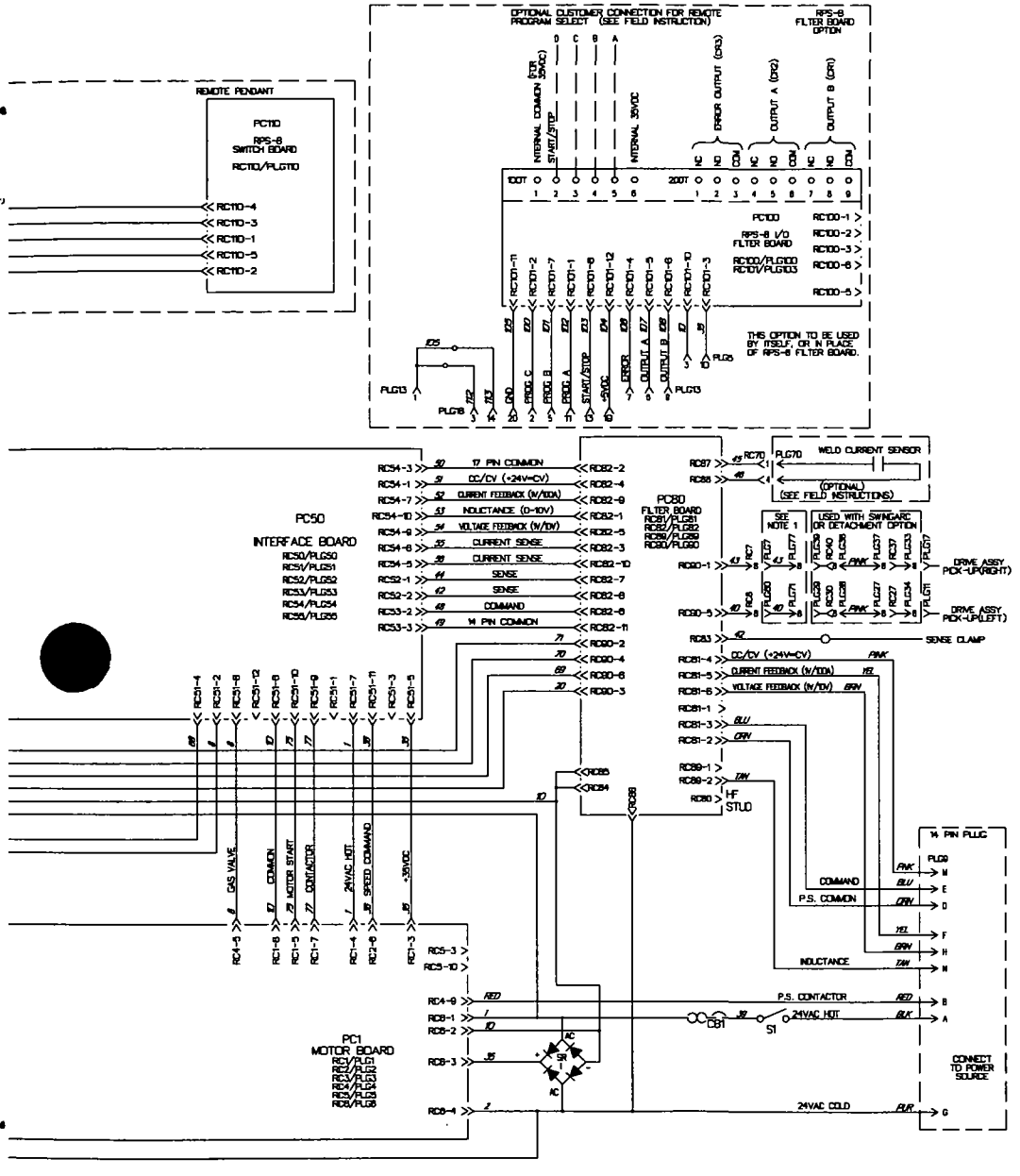


Figure 12-1. Circuit Diagram


OPTIONAL CUSTOMER CONNECTION FOR REMOTE PROGRAM SELECT (SEE FIELD INSTRUCTION)
RPS-8 FILTER BOARD OPTION
REMOTE PENDANT
PC110
RPS-8 SWITCH BOARD
RC110/PLG110
PC100
RPS-8 I/O FILTER BOARD
RC100/PLG100
RC101/PLG103
THIS OPTION TO BE USED BY ITSELF, OR IN PLACE OF RPS-8 FILTER BOARD.
PC50
INTERFACE BOARD
PC80
FILTER BOARD
PC1
MOTOR BOARD
WELD CURRENT SENSOR
(OPTIONAL)
(SEE FIELD INSTRUCTIONS)
SEE NOTE 1
USED WITH SWINGARC OR DETACHMENT OPTION
DRIVE ASSY. PICK-UP(RIGHT)
DRIVE ASSY. PICK-UP(LEFT)
SENSE CLAMP
HF STUD
14 PIN PLUG
CONNECT TO POWER SOURCE
17 PIN COMMON
DC/CV (+24V=CV)
CURRENT FEEDBACK (V/100A)
INDUCTANCE (0-10V)
VOLTAGE FEEDBACK (V/10V)
CURRENT SENSE
SENSE
COMMAND
14 PIN COMMON
GAS VALVE
COMMON
MOTOR START
CONTACTOR
24VAC HOT
SPEED COMMAND
+35VDC
COMMAND
P.S. COMMON
INDUCTANCE
P.S. CONTACTOR
24VAC HOT
24VAC COLD
CB1
S1
SR

SD-184 792-A

☞ *Hardware is common and not available unless listed.*

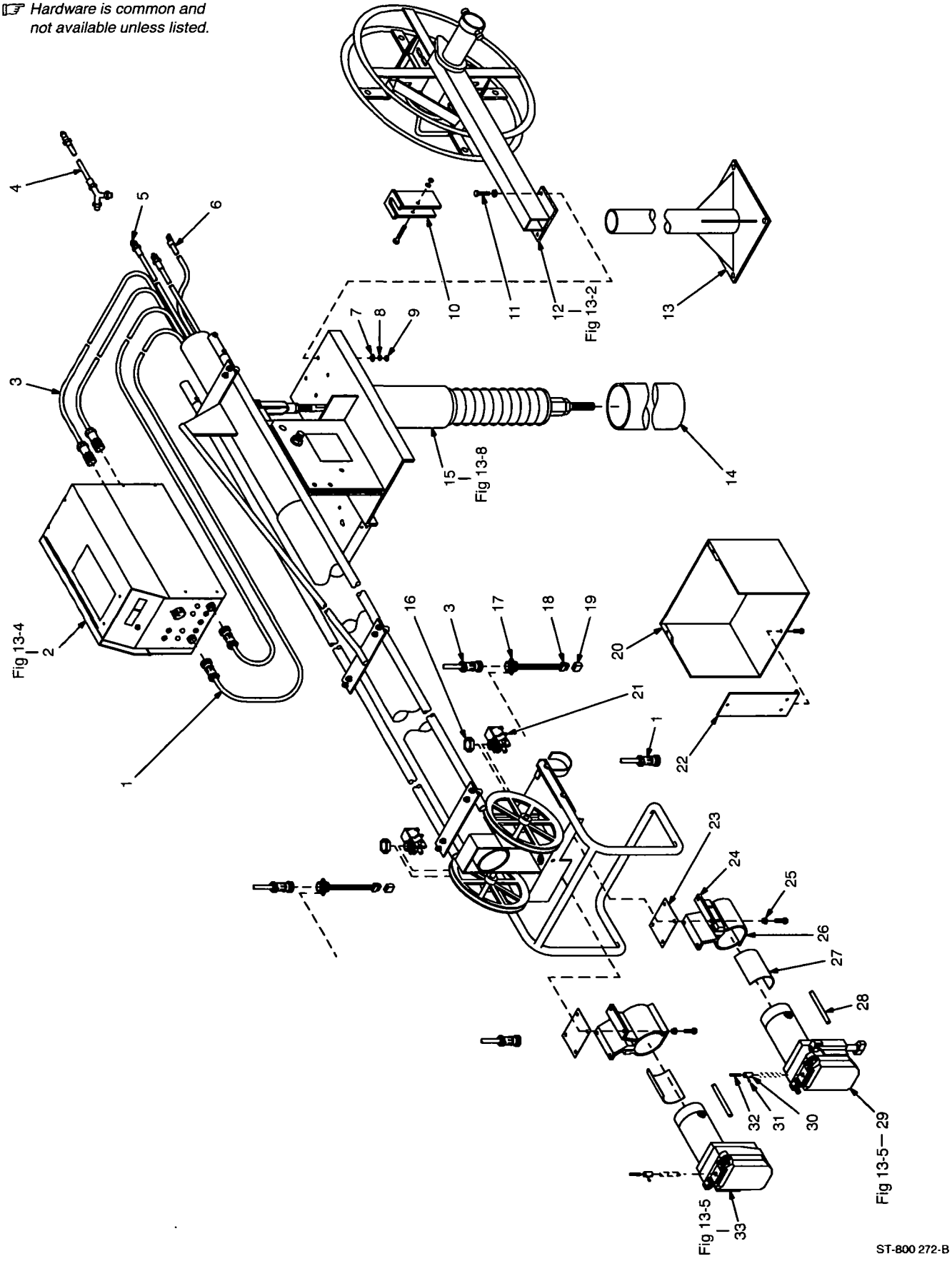


Figure 13-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity Model 12	Quantity Model 16
			Figure 13-1. Main Assembly		
1		149 251	CABLE, trigger (consisting of)	2	
1		149 252	CABLE, trigger (consisting of)		2
	PLG21,23	079 878	CONNECTOR & PINS	1	1
		079 531	CONNECTOR, circ clamp str rlf sz 11 Amp 206358-2	2	2
		605 156	CABLE, port No. 18 4/c (order by ft)	17ft	21ft
	PLG28,29	080 328	CONNECTOR w/SOCKETS	1	1
2		See Note	CONTROL BOX, (Fig 13-4)	1	1
3		164 475	CABLE, interconnecting (consisting of)	2	
3		164 474	CABLE, interconnecting (consisting of)		2
	PLG27,28,37,38	047 636	CONNECTOR & PINS	2	2
		079 739	CONNECTOR, circ clamp str rlf sz 17-20 Amp 206322-2	2	2
		163 519	CABLE, port No. 18/14 8/c (order by ft)	17ft	21ft
4		159 297	HOSE ASSEMBLY, gas	1	1
5		139 600	HOSE, gas	2	
5		139 599	HOSE, gas		2
6		600 324	CABLE, weld cop strd No. 4/0 (order by ft)	26ft	30ft
7		602 243	WASHER, flat stl std .375	8	8
8		602 213	WASHER, lock stl split .375	4	4
9		601 872	NUT, stl hex full .375-16	4	4
10		080 947	BRACKET, spring retaining	1	
10		151 626	BRACKET, spring retaining		1
11		132 053	SCREW, cap stl hexhd .375-16 x 1.500 lg	4	4
12		Fig 13-2	SUPPORT, hub & reel	1	1
13		♦149 838	PIPE POST, 4ft w/base or	1	
13		♦149 839	PIPE POST, 6ft w/base	1	
13		♦078 264	PIPE POST, 4ft w/base or		1
13		♦079 216	PIPE POST, 6ft w/base		1
14		♦075 078	PIPE POST, 4ft w/o base	1	1
14		♦079 217	PIPE POST, 6ft w/o base	1	1
15		Fig 13-8	BOOM ASSEMBLY	1	1
16		605 227	NUT, nyl hex jam .750NPST	2	2
17	RC27,37	047 637	CONNECTOR & SOCKETS	2	2
		048 144	CONNECTOR, circ pin plug keying Amp 200821-1	2	2
18	PLG11,17	115 092	CONNECTOR & SOCKETS	2	2
19	PLG33,34	135 409	CONNECTOR & PINS	2	2
20		139 813	COVER, protector motor	1	1
21	GS1,2	125 785	VALVE, 24VAC 2 way custom port 1/8 orf	2	2
22		139 816	PANEL, end cover	1	1
23		159 647	INSULATOR, motor clamp	2	2
24		156 243	CLAMP, motor top	2	2
25		159 360	INSULATOR, screw machine	8	8
26		159 646	CLAMP, motor base	2	2
27		145 639	STRIP, buna N compressed sheet .062 x 4.000sq	2	2
28		134 834	HOSE, SAE .187 ID x .410 OD (order by ft)	3ft	3ft
29		167 774	DRIVE ASSEMBLY, wire RH (Fig 13-5)	1	1
29		♦167 776	DRIVE ASSEMBLY, wire RH (high speed) (Fig 13-5)	1	1
30		157 295	GUIDE, monocoil		2
31		604 612	SCREW, set stl sch 8-32 x .125 cup point	4	4
32		082 050	LINER, monocoil inlet wire		2
		164 969	BUS BAR, connecting weld current	1	1
33		167 780	DRIVE ASSEMBLY, wire LH (Fig 13-5)	1	1
33		♦167 782	DRIVE ASSEMBLY, wire LH (high speed) (Fig 13-5)	1	1

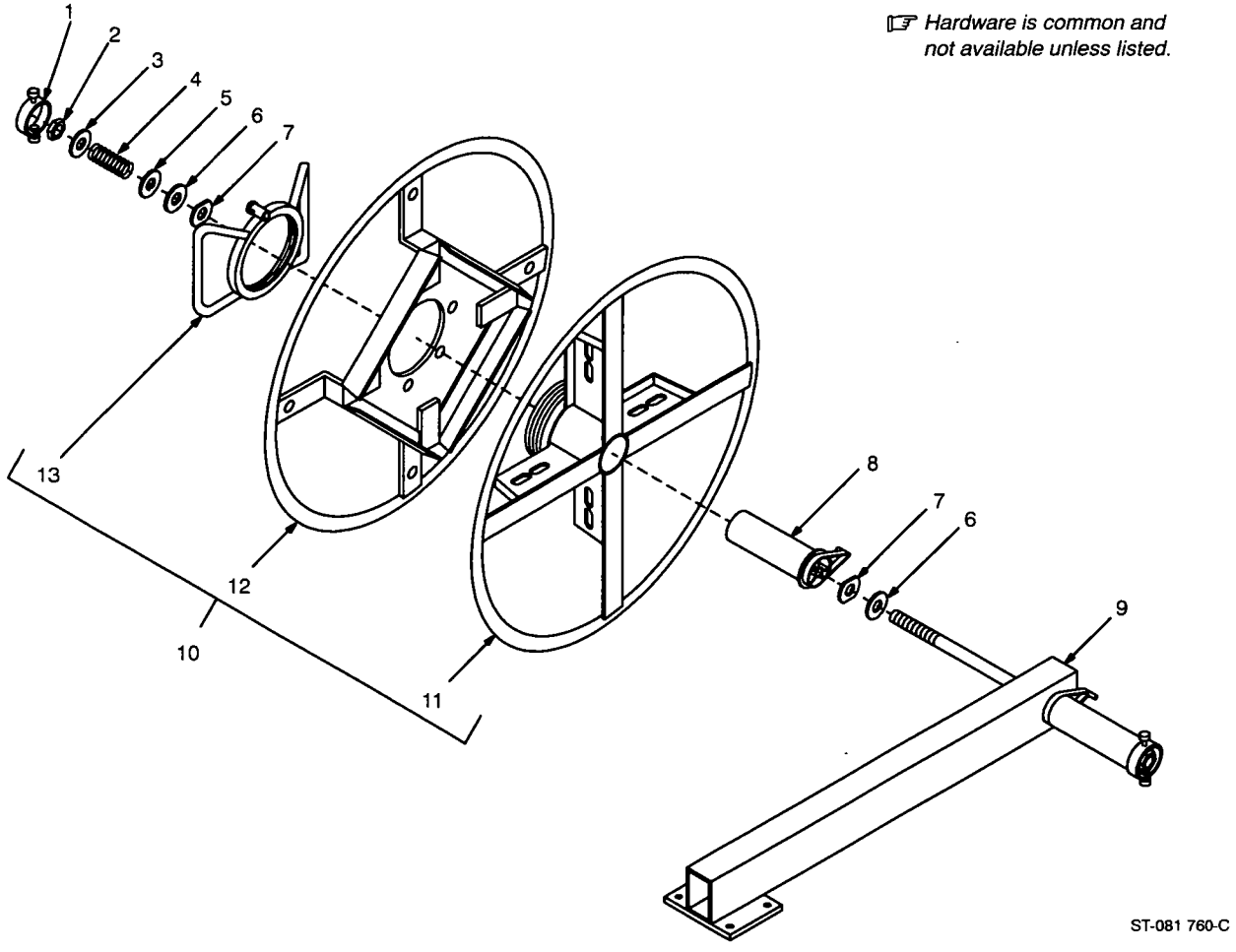
NOTE: When ordering Control Box contact Factory Service Department for proper number.
♦OPTIONAL

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Part No.	Description	Quantity

Figure 13-2. Support, Hub & Reel (Fig 13-1 Item 12)

1	058 427	RING, retaining spool	2
2	136 684	NUT, stl slflkg hex reg .625-11 w/nyl insert	2
3	605 941	WASHER, flat stl .640 ID x 1.000 OD x 14ga thk	2
4	010 233	SPRING, cprsn .970 OD x .120 wire x 1.250	2
5	057 971	WASHER, flat stl keyed 1.500dia x .125thk	2
6	010 191	WASHER, fbr .656 ID x 1.500 OD x .125thk	4
7	058 628	WASHER, brake stl	4
8	058 428	HUB, spool	2
9	080 393	SUPPORT, reel	1
10	♦108 008	REEL, wire 60 lb (consisting of)	2
11	124 900	. SUPPORT, reel spool	1
12	+168 104	. RETAINER, spool support (consisting of)	1
	166 594	.. LABEL, caution falling wire reel can cause damage	1
13	168 103	. NUT, spanner retaining	1



☞ *Hardware is common and not available unless listed.*

Figure 13-2. Support, Hub & Reel

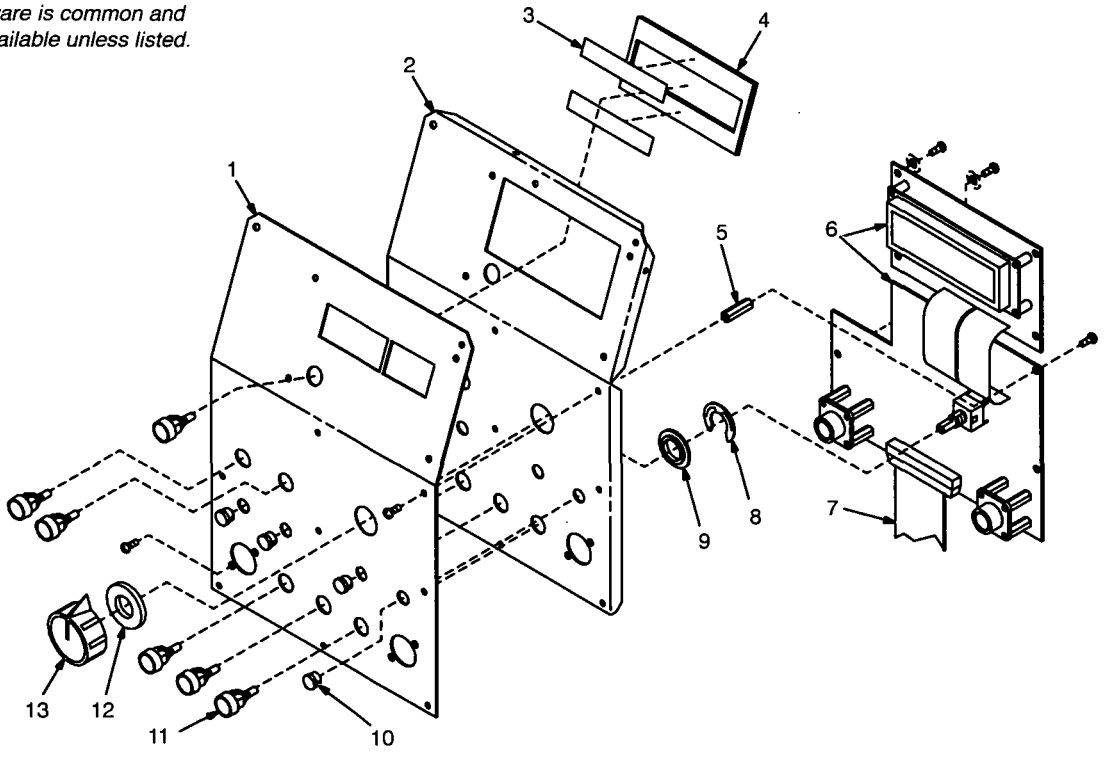
♦ OPTIONAL

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 13-3. Panel, Front w/Components (Fig 13-4 Item 28)	
1			NAMEPLATE, (order by model and serial number)	1
2		167 697	PANEL, front	1
3		147 139	TAPE, adh acrylic double sided .010 x .500 x 3.000	2
4		164 842	METER LENS, w/gasket	1
5		144 844	STAND-OFF, 6-32 x .875 lg	9
6	PC20,30	171 814	CIRCUIT CARD, schd front	1
	PLG25	165 484	CONNECTOR & SOCKETS (RC5)	1
7	PLG24		See Figure 13.4 Item 35 (RC24)	
8		159 264	RING, ext .625 shaft grv x .045thk E style	1
9		167 633	WASHER, shldr .612 ID	1
10		089 032	LENS, LED 4341 red panel mtg	4
11		153 169	ACTUATOR, switch	6
12		010 291	WASHER, flat .625 ID nylafil	1
13		167 700	KNOB, pointer	1

☞ *Hardware is common and not available unless listed.*



ST-800 112-C

Figure 13-3. Panel, Front w/Components

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

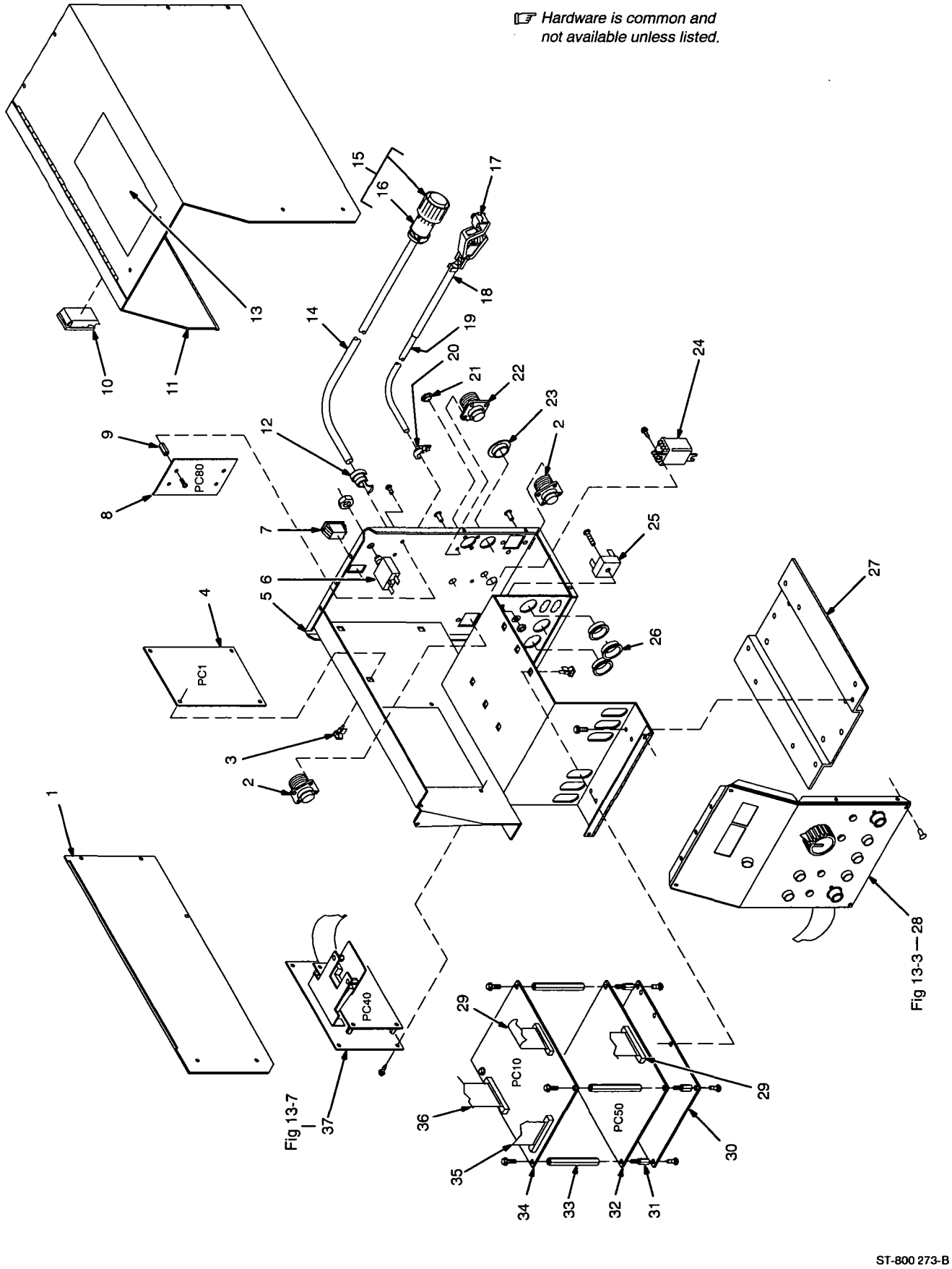


Figure 13-4. Control Box

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 13-4. Control Box (Fig 13-1 Item 2)	
1		162 253	PANEL, side lower	1
2	RC30,40	047 637	CONNECTOR & SOCKETS	2
		048 144	CONNECTOR, circ pin plug keying in sockets Amp 200821-1	4
3		134 201	STAND-OFF SUPPORT, PC card .312/.375	10
4	PC1	183 120	CIRCUIT CARD, motor control	1
	PLG1	115 092	CONNECTOR & SOCKETS (RC1)	1
	PLG2	115 093	CONNECTOR & SOCKETS (RC2)	1
	PLG4	115 091	CONNECTOR & SOCKETS (RC4)	1
	PLG6	136 810	CONNECTOR & SOCKETS (RC6)	1
5		184 824	CASE SECTION, bottom/rear	1
6	CB1	083 432	CIRCUIT BREAKER, man reset 1P 10A 250V	1
7	S1	111 997	SWITCH, rocker SPST 10A 250VAC	1
8	PC80	182 403	CIRCUIT CARD, HF filter dual	1
	PLG81	115 093	CONNECTOR & SOCKETS (RC81)	1
	PLG82	158 720	CONNECTOR & SOCKETS (RC82)	1
	PLG89	131 054	CONNECTOR & SOCKETS (RC89)	1
	PLG90	153 501	CONNECTOR & SOCKETS (RC90)	1
9		073 756	STAND-OFF, 6-32 x .625 lg	4
10		151 187	LATCH, slide flush mtg hole 1.000 wide x 1.500 lg	1
11		+162 364	WRAPPER	1
12		010 290	BUSHING, strain relief 1.030 ID	1
13		134 464	LABEL, warning general precautionary	1
14		163 520	CABLE, port No. 18/14 11/c (order by ft)	17ft
15	PLG9	141 162	CONNECTOR & PINS, (consisting of)	1
16		079 739	CONNECTOR, circ clamp str rlf sz 17-20 Amp 206322-2	1
17		601 222	CLAMP, univ 50A	1
18		176 089	TUBING, plstc PVC .250 ID x .375 OD x 9.000	1
19		600 399	WIRE, strd 14ga blk 600V 105c (order by ft)	35ft
20		138 044	BUSHING, strain relief .120/.150 ID x .500mtg hole	1
21		107 983	BLANK, snap-in nyl .500mtg hole	1
22	RC70	048 282	CONNECTOR w/SOCKETS	1
23		000 527	BLANK, snap-in nyl .875mtg hole	1
24	CR101	072 817	RELAY, encl 24VAC DPDT	1
25	SR1	035 704	RECTIFIER, integ 40A 800V	1
26		030 170	BUSHING, snap-in nyl .750 ID x 1.000mtg hole	3
27		145 948	BRACKET, mtg control box	1
28		Fig 13-3	PANEL, front w/components	1
29	PLG12,50	155 629	CABLE, ribbon 14posn (RC12) (RC50)	1
30		154 938	STRIP, mtg PC card	1
31		097 132	STAND-OFF, 6-32 x .375 lg	4
32	PC50	184 775	CIRCUIT CARD, interface	1
	PLG51	158 720	CONNECTOR & SOCKETS (RC51)	1
	PLG52	158 719	CONNECTOR & SOCKETS (RC52)	1
	PLG53	131 204	CONNECTOR & SOCKETS (RC53)	1
	PLG54	148 439	CONNECTOR & SOCKETS (RC54)	1
	PLG55	115 092	CONNECTOR & SOCKETS (RC55)	1
33		126 689	STAND-OFF, 6-32 x 1.500 lg	4
34	PC10	161 781	CIRCUIT CARD, processor w/proms	1
	PLG11	115 092	CONNECTOR & SOCKETS (RC11)	1
	PLG15	153 501	CONNECTOR & SOCKETS (RC15)	1
	PLG17	115 093	CONNECTOR & SOCKETS (RC17)	1
	PLG18	162 382	CONNECTOR & SOCKETS (RC18)	1
35	PLG10,24	170 980	CABLE, ribbon 34posn (RC10) (RC24)	1
36	PLG16,41	155 023	CABLE, ribbon 24posn (RC16) (RC41)	1
37		Fig 13-7	PANEL, side w/components	1
		010 146	CLAMP, nyl .625dia	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

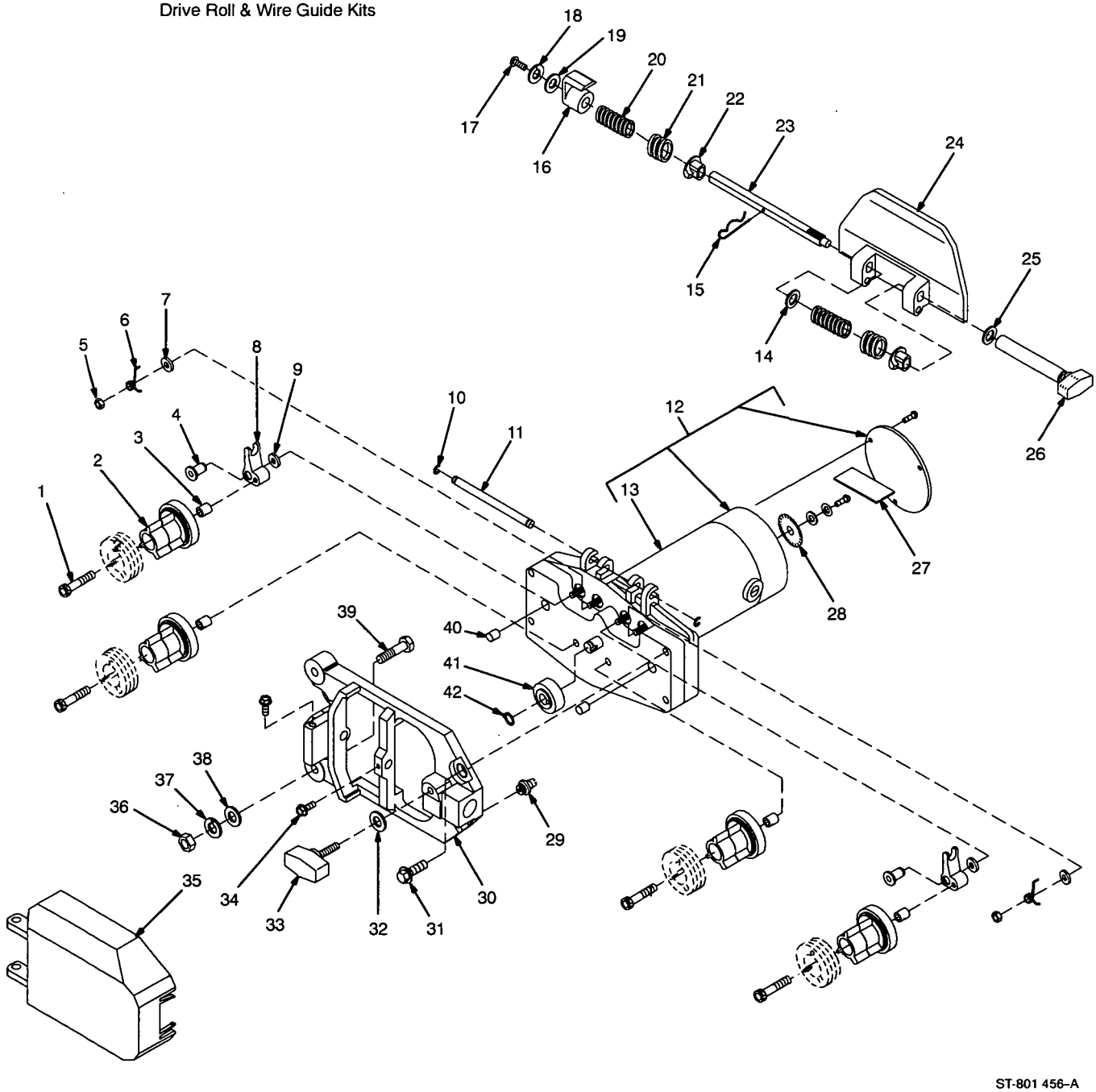


Figure 13-5. Drive Assembly, Wire

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 13-5. Drive Assembly, Wire (Fig 13-1 Items 29 & 33)	
1		010 668	SCREW, cap stl sch .250-20 x 1.500	4
2		172 075	CARRIER, drive roll w/components 24 pitch	4
3		149 962	SPACER, carrier drive roll	4
4		149 486	PIN, rotation arm rocker	2
5		163 282	NUT, .250-28 stl	2
6		165 798	SPRING, pressure arm retaining	2
7		165 799	WASHER, flat .257 ID stl	2
8		132 750	ARM, pressure	2
9		150 520	SPACER, rotation pin	2
10		133 493	RING, retaining ext .250 shaft x .025thk	2
11		133 350	PIN, hinge	1
12	M1,2	156 354	MOTOR, gear 1/8hp 24VDC 272RPM (consisting of)	1
12	M1,2	♦156 353	MOTOR, gear 1/8hp 24VDC 500RPM (consisting of)	1
		153 491	KIT, brush replacement (consisting of)	1
		153 492	CAP, brush	2
		*153 493	BRUSH, carbon	2
13		155 098	KIT, cover motor gearbox (consisting of)	1
		153 550	COVER, motor gearbox (consisting of)	1
		155 099	GASKET, cover	1
		155 100	SCREW, cover	5
		154 031	SPACER, locating	2
		133 493	RING, rtng ext .250 shaft grv x .025thk	1
		184 136	KIT, brush holder	1
14		182 414	WASHER, flat	1
15		182 415	PIN, cotter hair	1
16		137 248	SPRING, indicator	1
17		129 351	SCREW, hexwhd-slt stl slffmg 8-32 x .500	1
18		602 200	WASHER, lock stl split No. 8	1
19		604 772	WASHER, flat stl SAE No. 8	1
20		182 156	SPRING, cprsn	2
21		182 155	SPRING, cprsn	1
22		132 746	BUSHING, spring	2
23		181 522	SHAFT, spring	1
24		132 747	CARRIER, shaft	1
25		133 739	WASHER, flat .375 ID x .625 OD x .062	1
26		183 330	KNOB, extension	1
27	PC51	153 631	CIRCUIT CARD, digital tach (consisting of)	1
	PLG57	131 204	CONNECTOR & SOCKETS	1
		604 311	GROMMET, rbr .250 ID x .375mtg hole	1
	PLG58	131 203	CONNECTOR & PINS	1
28		132 611	OPTICAL ENCODER DISC	1
29		149 959	FITTING, brs barbed M 3/16tbg x .312-24	1
30		179 265	ADAPTER, gun/feeder LH	1
31		108 940	SCREW, cap stl hexwhd .250-20 x .750	4
32		604 538	WASHER, flat stl SAE .312	1
33		151 437	KNOB, plstc T 1.125 lg x .312-18 x 1.500 bar	1
34		128 237	SCREW, hexwhd-slt stl slffmg 10-32 x .500	2
35		+179 263	COVER, drive roll (consisting of)	1
		178 937	LABEL, warning electric shock and pinch	1
36		601 872	NUT, stl hex full .375-16	1
37		602 213	WASHER, lock stl split .375	1
38		602 243	WASHER, flat stl .375	1
39		601 966	SCREW, cap stl hexhd .375-16 x 1.250	1
40		167 387	SPACER, locating	2
41		168 825	DRIVE, pinion 40T 24P .376 bore	1
42		133 308	RING, retaining ext .375 shaft x .025thk	1

♦Part of 132 129 Optional High Speed Motor
*Recommended Spare Parts.
+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Table 13-1. Drive Roll and Wire Guide Kits

Wire Size		Inlet Guide	Intermediate Guide	V-GROOVE		U-GROOVE		VK-GROOVE		UC-GROOVE	
Fraction	Metric			4 Roll Kit	Drive Roll	4 Roll Kit	Drive Roll	4 Roll Kit	Drive Roll	4 Roll Kit	Drive Roll
.023-.025 in.	0.6 mm	150 993	149 518	151 024	087 130						
.030 in.	0.8 mm	150 993	149 518	151 025	053 695						
.035 in.	0.9 mm	150 993	149 518	151 026	053 700	151 036	072 000	151 052	132 958		
.040 in.	1.0 mm	150 993	149 518	161 189	053 696						
.045 in.	1.1/1.2 mm	150 994	149 519	151 027	053 697	151 037	053 701	151 053	132 957	151 070	083 489
.052 in.	1.3/1.4 mm	150 994	149 519	151 028	053 698	151 038	053 702	151 054	132 956	151 071	083 490
1/16 in. (.062 in.)	1.6 mm	150 995	149 520	151 029	053 699	151 039	053 706	151 055	132 955	151 072	053 708
.068-.072 in.	1.8 mm	150 995	149 520					151 056	132 959		
5/64 in. (.079 in.)	2.0 mm	150 995	149 520			151 040	053 704	151 057	132 960	151 073	053 710
3/32 in. (.094 in.)	2.4 mm	150 996	149 521			151 041	053 703	151 058	132 961	151 074	053 709
7/64 in. (.110 in.)	2.8 mm	150 996	149 521			151 042	053 705	151 059	132 962	151 075	053 711
1/8 in. (.125 in.)	3.2 mm	150 997	149 522			151 043	053 707	151 060	132 963	151 076	053 712

Each Kit Contains An Inlet Guide, Intermediate Guide, And 045 233 Antiwear Guide With 604 612 Setscrew 8-32 x .125, Along With 4 Drive Rolls.
2 Kits Required For Dual Models.

S-0549-D

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 13-6. Panel, Side w/Components (Fig 13-4 Item 37)	
1		147 139	TAPE, adh acrylic double sided .010 x .500 x 3.000	2
2		155 024	LENS, clear anti-glare	1
3		154 933	PANEL, inner control	1
4	PC60	156 623	CIRCUIT CARD, data card	1
	PLG60	153 501	CONNECTOR & SOCKETS (RC60)	1
5	PLG41		See Fig 13-3, Item 40 (RC41)	
6	PC40	158 160	CIRCUIT CARD, side display	1
7		144 844	STAND-OFF, 6-32 x .875 lg	4
8		154 109	PLATE, ident inner control	1
9		153 169	ACTUATOR, switch	4

☞ *Hardware is common and not available unless listed.*

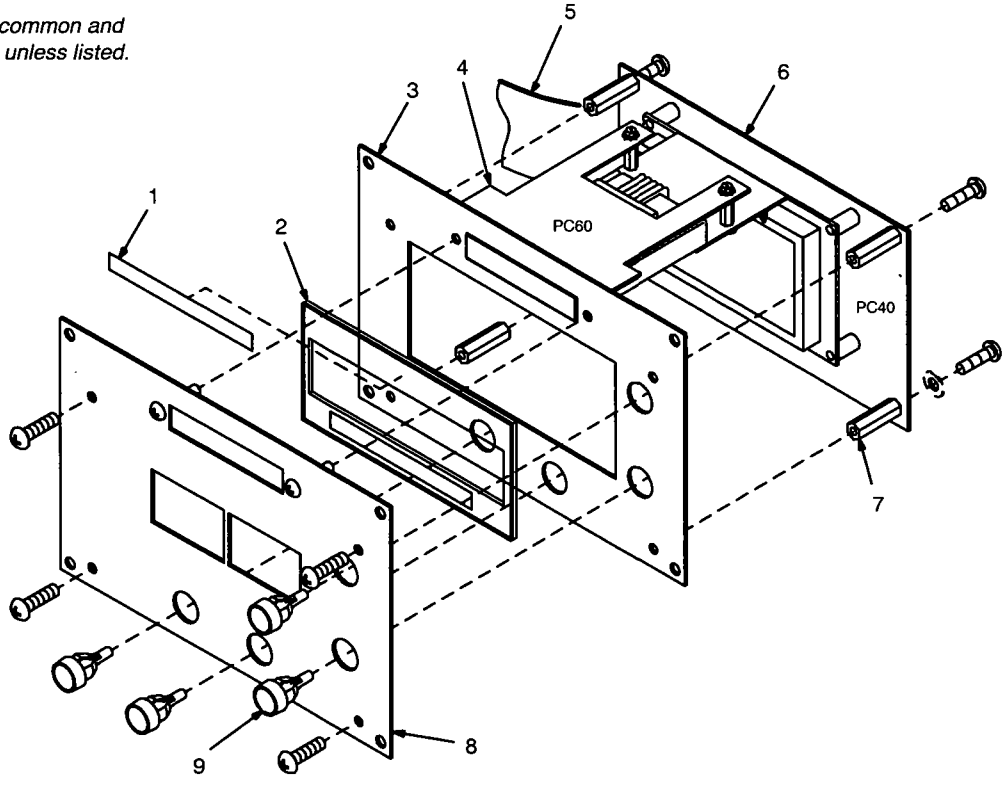


Figure 13-6. Panel, Side w/Components

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

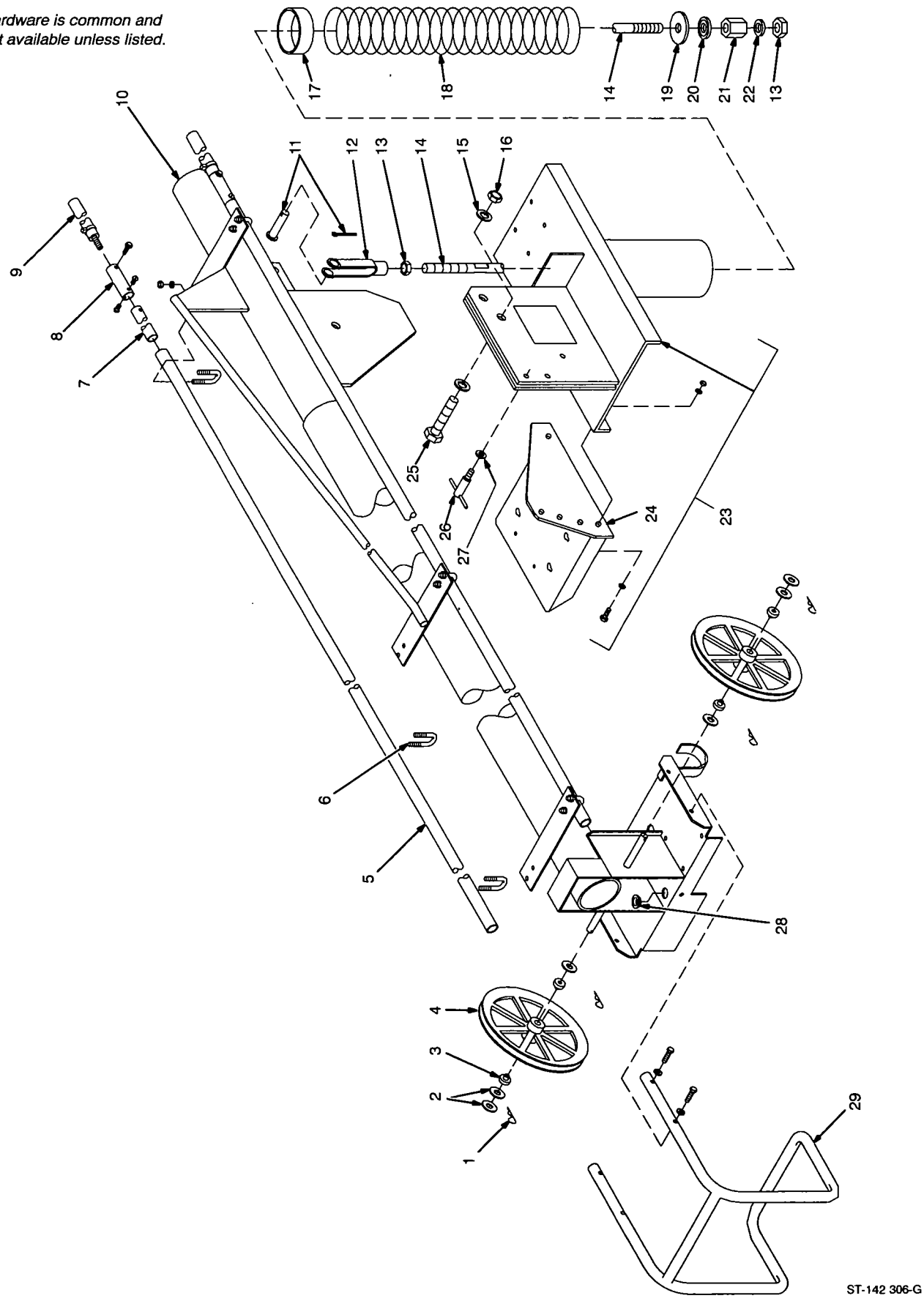


Figure 13-7. Boom Assembly

Item No.	Part No.	Description	Quantity Model 12	Quantity Model 16
		Figure 13-7. Boom Assembly (Fig 13-1 Item 15)		
1	010 313	PIN, cotter hair .072 x 1.437	4	4
2	010 910	WASHER, flat stl SAE .375	6	6
3	079 622	WASHER, shld .381 ID x .750 OD	2	2
4	079 621	PULLEY, V sgl grv 7.750dia x 8.000P x .625 bore	2	2
5	079 667	PIPE, plstc .500 x 133.750	2	
5	080 812	PIPE, plstc .500 x 181.750		2
6	079 632	BOLT, U stl .250-20 x .875 wide x 1.375 deep	8	10
7	079 665	GUIDE, wire	2	
7	080 811	GUIDE, wire		2
8	079 664	GUIDE, wire inlet	2	2
9	139 633	LINER, monocoil 3/32-1/8 wire x 15.687	2	2
10	159 999	BOOM, dual	1	
10	160 513	BOOM, dual		1
11	073 742	PIN, clevis .750 OD x 2.156 lg	1	1
12	073 741	CLEVIS, .812 yoke 6.062 lg .750-16thd	1	1
13	079 029	NUT, stl hex full fnsh .750-16	2	2
14	075 462	SHAFT, boom counterbalance	1	1
15	602 250	WASHER, flat stl SAE .750	2	2
16	079 020	NUT, stl hex elastic stop .750-16	1	1
17	155 335	PIPE, blk 3.000 x .875		1
18	149 858	SPRING, cprsn 3.750 OD x .625 wire x 36.000	1	
18	151 625	SPRING, cprsn 3.750 OD x .640 wire x 36.000		1
19	150 258	RETAINER, spring	1	1
20	024 605	BEARING, ball thr sgl row .750 x 1.625 x .625	1	1
21	075 101	NUT, stl hex special .750-16 x 1.250	1	1
22	079 030	WASHER, lock stl ext tooth .750	1	1
23	+174 754	BASE, swivel boom (consisting of)	1	1
	080 157	FITTING, grease 1/8NPT	1	1
24	174 688	BRACKET, mtg control tilt	1	1
	142 804	LABEL, Swingarc caution heavy spring	1	1
	134 327	LABEL, warning general precautionary	1	1
25	073 666	BOLT, mach stl hexhd .750-16 x 2.750	1	1
26	047 224	KNOB, T-bar .500-13thd	1	1
27	602 246	WASHER, flat stl std .500	1	1
28	010 493	BUSHING, snap-in nyl .625 ID x .875mtg hole	1	1
29	139 818	GUARD, motor protector	1	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

OPTIONS AND ACCESSORIES

WELD CURRENT SENSOR
(#160 963)
This option is required when using M feeders with older style Miller CV power sources: Deltaweld® prior to serial no. KG141349 and Dimension™ prior to serial no. KC253517.

POWER SOURCE DATA CARD FOR XMT 304 CC/CV
(#043 390)
Simply insert the Data Card in the 60M control and with the push of a button the eight synergic pulse programs for the XMT 304 are loaded in memory and ready to use.

The eight XMT programs are for:
.030 in steel wire with Argon/CO^2
.035 in steel wire with Argon/CO^2
.045 in steel wire with Argon/CO^2
.030 in SS wire with Pulse tri-mix
.035 in SS wire with Pulse tri-mix
.045 in SS wire with Pulse tri-mix
.035 in SiB wire with Argon
.035 in Nickel wire with Ar/He

60M DATA CARD
(#155 910) Blank Card
Stores up to 32 complete weld programs. Ideal for saving custom programs and transferring programs to other 60M feeders.

The Maxtron™ 450 can use factory programs in the 60M, but will require the factory set voltage and current range to be reset.

CONTROL DETACHMENT KIT
For 60M bench models only.

For S-60M Model
(#134 936) 10 ft. (3 m) Field
(#134 937) 25 ft (7.6 m) Field

For D-60M Model
(#134 935) 25 ft (7.6 m) Field
Separates the feeder control module from the wire drive assembly and base. Ideal when using Automation Upgrade Module.

AUTOMATION UPGRADE MODULE
(#172 886)
This module consists of an I/O board and software upgrade that enables the 60M control to better communicate with other peripheral equipment and improves performance in an automatic welding cell.

Features: two programmable outputs, remote start/stop, remote program select, arc voltage monitor, arc error monitor and wire stick check.

WIRE STRAIGHTENER
For .035 – .045 in (0.9 – 1.1 mm) wire
(#141 580)
For 1/16 – 1/8 in (1.6 – 3.2 mm) wire
(#141 581)
Reduces cast in wire. Improves wire feeding performance and increases life of gun liner and contact tip.

HIGH-SPEED MOTOR
For single and right side of dual models
(#132 129) Factory only
For left side of dual wire models
(#132 130) Factory only
Provides wire speed range of 90 – 1400 IPM (2.3 – 35.6 m/min). Not recommended for wire sizes larger than 5/64 in (2.0 mm).

Same speed motor must be used on each side of the dual wire models. Factory-written synergic Pulse MIG programs will not operate with high-speed motor.

WATER HOSE KIT
For bench-style feeders
(#096 746) 10 ft (3 m)
Use with Miller coolant systems and water-cooled welding guns. Can be used with or without optional water flow safety switch.

If water kit is to be used on both sides of a dual wire feeder, a kit must be ordered for each side of the feeder.

WATER FLOW SHUTDOWN SWITCH
For use with the water hose kits
(#180 390)
Protects water-cooled gun from overheating by shutting down system if water does not flow.

If required on both sides of a dual model, two water flow shutdown switches must be ordered.

DUAL SCHEDULE SWITCHES
For use with Dual Schedule Control in 60M feeder.

DSS-8
(#079 693)
Requires adapter cord #157 364. Two-position trigger switch that easily attaches to the welding gun. Use in place of the standard trigger for dual scheduling.

DSS-9M
(#041 793)
Two-position slide switch that attaches to the welding gun. Selects welding condition when utilizing the dual schedule feature. Gun trigger operates as standard trigger.

RPS-8 REMOTE PROGRAM SELECTOR
(#160 977) Field
Eight-position rotary switch used to remotely select weld programs. Includes 33 ft (10 m) cord to connect feeder.

DSS-10 REMOTE INCREASE/DECREASE SWITCH
(#042 749)
Two-position, momentary contact switch that attaches to the welding gun. Use with the Remote Parameter Increase/Decrease feature to fine tune parameters at the welding gun while welding. Gun trigger operates as standard trigger.

WIRE REEL ASSEMBLY
(#108 008)
Accommodates 60 lb (27 kg) coil of wire.

OPTIONS AND ACCESSORIES

REEL COVERS
Accommodates 60 lb (27 kg) coil of wire.

(#058 256)
For S-60M single wire model and left side of D-60M dual wire model.

(#091 668)
For right side of D-60M dual wire model. Protects wire from contaminants.

SPOOL COVERS
Fits a 12 in (304 mm) spool of wire.

(#057 607)
For S-60M single wire model and left side of D-60M dual wire model.

(#090 389)
For right side of D-60M dual wire model.

CARRYING CART
(#056 301)
Carries wire feeder and miscellaneous welding sup plies. Height: 34 in (863 mm). Lower tray height: 9 in (228 mm). Shipped disassembled.

FEEDER CART
(#142 382)
Low-profile, creeper cart. Shipped disassembled.

HANGING BAIL
(#058 435)
Electrically isolated. Suspends feeder over work area.

TURNTABLE ASSEMBLY
(#146 236)
Allows feeder to rotate as operator changes work position. Reduces strain and bending of gun cable.

ADJUSTABLE SPOOL CARRIER
(#096 075)
For use only with Swingarc models with 6 ft (1.8 m) pipe post mounted on Swingpak base.

Replaces standard spool assembly. Positions welding wire lower for easier loading and unloading.

EXTENSION CORDS
For optimum performance, do not extend 60M feeder more than 60 ft (18 m) from power source.

14-Pin Extension Cord

(#043 690) 25 ft (7.6 m)
(#043 691) 50 ft (15 m)

WATER COOLANT SYSTEMS
Refer to Water Coolant Systems literature, Index No. AY/7.2.

TRUE BLUE® WARRANTY

Effective January 1, 1997
(Equipment with a serial number preface of "KH" or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. .THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Robots
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor
   * Motor Driven Guns (w/exception of Spoolmate 185)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * Orbital Weld Heads
   * IHPS Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Spot Welders
   * Load Banks
   * SDX Transformers
   * Miller Cyclomatic Equipment
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT, ZIPCUT & PLAZCUT Models)
   * Deutz Engines (outside North America)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts and Labor
   * MIG Guns/TIG Torches
   * APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate 185

Miller's True Blue® Limited Warranty shall not apply to:

1. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
2. Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

Warranty Questions?

Call 1-800-4-A-MILLER for your local Miller distributor.

Miller
The Power of Blue.

Owner's Record

Please complete and retain with your personal records.

Model Name	**Serial/Style Number**
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	**Zip**

Resources Available

Always provide Model Name and Serial/Style Number.

Contact your Distributor for: To locate distributor nearest you call 1-800-4-A-Miller.	Welding Supplies and Consumables Options and Accessories Personal Safety Equipment Service and Repair Replacement Parts Training (Schools, Videos, Books) Owner's Manuals Technical Manuals (Servicing Information and Parts) Circuit Diagrams Welding Process Handbooks
Contact the Delivering Carrier for: For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.	File a claim for loss or damage during shipment.

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PRINTED IN USA

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